

PUBLIC HEALTH ACT.

(11 & 12 Vict., Cap. 63.)

R E P O R T

TO THE

GENERAL BOARD OF HEALTH

ON A

PRELIMINARY INQUIRY

INTO THE SEWERAGE, DRAINAGE, AND SUPPLY OF
WATER, AND THE SANITARY CONDITION
OF THE INHABITANTS

OF THE TOWN AND PORT OF

DOVER.

BY ROBERT RAWLINSON,

SUPERINTENDING INSPECTOR.



L O N D O N :

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FOR HER MAJESTY'S STATIONERY OFFICE.

1849.

NOTIFICATION.

THE General Board of Health hereby give notice, in terms of section 9th of the Public Health Act, that on or before the 1st day of January, 1850, written statements may be forwarded to the Board with respect to any matter contained in or omitted from the accompanying Report on the Sewerage, Drainage, and Supply of Water, and the Sanitary Condition of the Inhabitants of the Town and Port of DOVER, or with respect to any amendment to be proposed therein.

By order of the Board,

HENRY AUSTIN, *Secretary.*

*Gwydyr House, Whitehall,
24th November, 1849.*

PUBLIC HEALTH ACT (11 and 12 Vict., Cap. 63.)

Report to the General Board of Health, on a Preliminary Inquiry into the Sewerage, Drainage, and Supply of Water, and the Sanitary Condition of the Inhabitants of the Town and Port of DOVER. By ROBERT RAWLINSON, Civil Engineer, Superintending Inspector.

London, May, 1849.

MY LORDS AND GENTLEMEN,

ON Monday, December 4, 1848, according to your instructions. and upon a petition from more than one-tenth of the rated inhabitants, I made public inquiry and examined witnesses with respect to the present state and condition of the town and port of Dover and the surrounding district, and beg respectfully to submit this as my Report on the same.

The inquiry took place in the "Maison Dieu," now the new Town Hall, commencing at 10 o'clock in the forenoon, and was continued every day during the week, either in open court or by public inspection of the streets, courts, houses, yards, and other places. I ascertained from Mr. Thomas B. Bass, the town clerk, that the proper notice had been posted in the appointed places throughout the town, and also that the said notice had been advertised in the local papers, as the Act requires. I opened the Court by reading over the several heads of inquiry. There was a show of opposition at the commencement, made by a portion of the Paving Commissioners, and introduced by Mr. Robinson, auctioneer, on the grounds stated in the following resolution, passed at one of the meetings of that body :—

"That a Committee be appointed to take into consideration the effect the introduction of the Health of Towns Act will have on the pecuniary interests of the inhabitants and the rights of the householders, they having a better and cheaper mode of government than that intended by the Act." (The Public Health Act.)

The voluntary evidence of the inhabitants and householders given in this Report, will be a full answer to this resolution, and it must also be observed that many of the Paving Commissioners

signed the petition in favour of this inquiry; voluntarily furnished evidence in proof of their inability to do the necessary work of sewage, drainage, &c., and expressed themselves most anxious to remove the causes of sickness from the cottages of the poor.

There were present during the inquiry or personal inspection, Anthony Freeman Payn, Esq., mayor, Mr. Thomas Bass, town clerk, Dr. Soulby, Mr. E. Knocker, solicitor, Mr. E. Sell, Alderman James Poulter, Mr. C. B. Wilkins, Mr. E. Poole, Mr. R. T. Hunt, Mr. P. Ayers, Mr. H. Hughes, Mr. E. Gotto, surveyor, Mr. G. T. Parks, Mr. Metcalf, Mr. D. Humberstone, Mr. Seward, Mr. Robinson, Mr. E. J. Dixon, Mr. J. Francis, Mr. M. Huntley, surveyor, Mr. R. Rees, architect, Mr. H. Humphries, Mr. C. B. Goreley, Mr. James Olifent, Mr. T. M. Pain, relieving officer, Mr. J. Sims, Mr. G. C. Pound, Mr. H. Hart, Mr. A. Page, Mr. M. Horsenail, Mr. Caspall, Mr. John Walton, surgeon, Mr. J. Bates, Mr. Ronget, Mr. G. E. Rutley, surgeon, Mr. J. Moss, Mr. H. McToldrige, and others. Every facility was afforded me in prosecuting the inquiry, and the clergy gave me their valuable support; their written evidence will be found embodied under the several heads of this Report. During my inspection I had the company and assistance of Dr. Soulby, Mr. E. Knocker, Mr. Gotto, Mr. M. Huntley, and others. There were many solicitations from parties to examine private nuisances; and in all cases the poor, and the inhabitants of cottages, readily offered the fullest means for an inspection of their premises. I personally examined many confined courts, yards, and back streets; the outlets to such sewers and drains as then existed, the state of the burial grounds, and the condition of the town in general; I traced the river Dour to its source, to where it rises from the chalk, in springs a few miles above the town, and I examined the district for a considerable distance to the north and west.

THE TOWN.—The town of Dover, in latitude $51^{\circ} 8'$, and longitude $1^{\circ} 19' 2''$, is situated on the site of the Roman Portus Dubris, and on the narrowest part of the British Channel; it is one of the cinque ports, a borough returning two members to Parliament, and a market town, having separate jurisdiction and the head of a Union, locally in the lathe of St. Augustine east division of Kent, (S.E. by S.) from Canterbury, and 7 (E.S.E.) from London, the town proper containing about 13,871 inhabitants; the borough in 1841 contained 19,168 inhabitants but at the present time there are upwards of 20,000 inhabitants.

The ancient British name of the town was Dwyr, derived from Dwfyrha, a steep place; by the Romans it was called Dubris, and by the Saxons Dofra and Dofris, which is

SANITARY REPORT ON DOVER.

May, 1849.

From the Ordnance Survey.



Municipal Boundary

Scale, 4 Inches to 1 Mile.

1 Mile

“Domesday Book” are softened into *Dovere*. Dover is at present spelled indiscriminately *Dover* or *Dovor*. *Dover* is the more common method.

In the time of the Romans Dover was a sea-port, and at one period was surrounded by walls, having ten gates; the greater part of the foundation of the ancient town-wall may still be traced. The town is built to accommodate itself to the form of the cliffs and shore-line, and has a concave front towards the sea; part of the town has now extended up the valley of the Dour, principally on its western side, and many new houses have been built on the beach, to the east of the harbour, being an extension of the town towards and under the Castle cliffs. The site of the old town and eastern extension is flat and low, having little elevation above the sea at high water. The old part of the town is also irregular in plan, and the streets are narrow; the site is, in some portion, even under high-water level of an extreme spring tide. These low and flat portions are flooded, when heavy rainfall takes place at the top of high water. This must naturally be the case, and no remedy will prevent this flooding other than pumping off the surplus water at all such times.

THE HARBOUR.—There is traditionary evidence that an ancient harbour extended to a considerable distance up the valley and inland from the present shore-line, and it is asserted that Arviragus constructed, or attempted to construct, a dam across the mouth of it, A.D. 44, which dam was the means of its silting up and final destruction. In 1086 the harbour is named in “Domesday Book” as follows: “At the entrance of the port a mill has been lately built, which causes a swell, and damages the ships that pass near it.” The ships which such a swell could damage must have been small, and most frail. But the writer was probably wrong in his conclusions. At present there are mills at intervals on the whole course of this stream, the damage from which is, however, confined to the land and neighbouring houses, by backing up the water and stopping effective land drainage. The valley behind St. Mary’s church, to the north of Castle-street, is kept partially under water and damp by the mill at the bottom of Castle-street, and the condition of this district cannot be improved, unless the mill-dam is lowered so as to allow of a free natural drainage to the land. Mill-dams near a town generally block the natural drainage, and consequently are the cause of undue damp, which is injurious to health. All such mills should be removed. Dover was the first of the cinque ports incorporated; in 1272, Edward I. confirmed its ancient rights, and granted a charter to the inhabitants, and acknowledged the corporation by the name of “mayor and commonalty.” In 1500, the old harbour had

become useless. During the reign of Henry VII. and Henry VIII. a pier was commenced, extending 131 rods eastward from Archcliff Fort into the sea. Henry VIII. expended more than 63,000*l.* upon the construction of this pier; and Queen Mary granted letters patent to collect money throughout England to complete or repair it. Queen Elizabeth also granted certain rights and privileges of free exportation to the town for the repair of the harbour, which rights produced 8,666*l.* 13*s.* 4*d.*; and this sum proving insufficient for the purpose, certain dues on coals and grindstones landed for sale were granted in 1580. In 1606, James I. placed the management of the harbour in the hands of commissioners, and from that time to the present various large sums of money have been expended in repairing and extending the harbour and piers; and it is now in contemplation to wall in a great portion of the bay, to form a harbour of refuge, which shall have seven fathoms depth of water at low water of spring tides. The following is an extract from "The Commissioners' Report upon Harbours of Refuge, presented to the House of Commons, in pursuance of an Address, dated 6th March, 1845."

"DOVER.—History affords proof of the importance attached to this place as a military and naval station.

"As the advanced port of England on the south-east coast, the want of a harbour here of sufficient capacity for the reception of vessels of war, and for the convenience and protection of trade, has attracted the notice of sovereigns and ministers from the earliest times, and has led to a large expenditure of money for the improvement of the present tidal harbour.

"Dover, situated at a distance of only four miles and a half from the Goodwin Sands, and standing out favourably to protect the navigation of the narrow seas, is naturally the situation for a squadron of ships of war. Its value in a military point of view is undoubted; but the construction of a harbour of refuge there is, in our opinion, indispensable, to give to Dover that efficiency as a naval station which is necessary in order to provide for the security of this part of the coast, and the protection of trade."

This question will be found to bear largely upon the present, and also upon the future, condition of the town and district in a sanitary point of view, as provision should be made in the sanitary works for a large increase to the resident and floating population.

The inhabitants of Dover have a character to maintain for the town, both as a military and naval station, and also as a marine residence for summer and winter visitors. Those rate-payers and owners of property who would oppose wise sanitary measures, do not consider the fatal consequences to themselves. All the singular and great advantages conferred by nature upon the site cannot be preserved unless there is a perfect system of drainage carried out; the foul state of the port and harbour

should be remedied by excluding every portion of refuse from them, and the purity of the beach is absolutely necessary to sea-bathers. Foul cesspools and dumb-wells may be covered from the sight of the inhabitants generally, and also from the sight of casual visitors and lodgers; but the subtle emanations from them will inevitably affect all. There is no escape from the fatal consequence of such a state of things. A pure and wholesome atmosphere can only be maintained in dwelling-houses by the instant removal of all the refuse generated, and this can best be accomplished by a perfect system of street and house drainage; and the cost of this is actually much less than the present objectionable and imperfect mode of digging cesspools, with drains into them, such as are constructed for houses of the better class, or for the more disagreeable and objectionable practice of using a mere open tub, as in cottages. This statement will be found fully borne out by the accompanying evidence.

GEOLOGY.—The cretacious or chalk formation is one of great thickness and wide extent of area; some of the extreme points in its length are more than one thousand geographical miles asunder, and it is several hundred miles in width. It is considered by geologists to have been deposited in the bed of a former ocean; and under the microscope most of its substance is found to consist of fragments of corals, sponges, valves of cytherina, shells of foraminifera, and the still more minute infusoria. About a thousand well preserved marine fossils and fragments of fossils have been found in one pound weight of chalk.

The smooth rounded outline of the white chalk hills is, no doubt, the effect of the water of a former ocean having had a wearing action during the time the whole of this land was, by the action of gravity, gradually rising from the sea; but this smooth and even surface appearance does not belong properly to the existing surface of the chalk, it is rather due to the diluvial deposit laid over it. If this superficial covering could be wholly stripped off, and the pure chalk formation be laid bare, a very rough and uneven surface of chalk would be presented to view; ridges and valleys would be found interspersed with vertical hollows, funnel-shaped, of varying size and depth, and these inequalities would also present the peculiar features attendant upon the action of water. The vertical "pot-holes," as they are termed, have probably been drilled out by the whirling action of strong ocean or river currents moving gravel round, to act as a drill or boring apparatus, just as the seashore and beds of many rivers, and the bed of the ocean, is now acted upon by existing currents. In the bed of the river Dee, in North Wales, the hardest rocks are actually drilled and

bored by these means to an extent which wears and breaks up the entire width of the channel. These circular and elliptical forms are found in rocks and river courses throughout the world. The same circular action of the water in a large river, with a rapid stream, is a dangerous whirlpool; in the ocean it is the dreaded Maelstrom. The form of surface which the chalk bears is an important feature in its character, because it may explain what may and what may not be done upon and in it. As the entire surface is generally covered and filled in with diluvial gravel and sand, highly porous and absorbent, it would be extremely difficult to construct large impounding reservoirs on its surface for a water supply, and it also accounts for the comparatively few brooks and rivers found on the chalk, compared with other formations, except such watercourses as owe their origin to the powerful and numerous springs which issue from its lower outcrop. The chalk, within a considerable distance of the surface, is also extremely dangerous to trust in tunneling, as the pipe formations and pot-holes may give no indication of their presence to the miner, until they burst through upon him, as was the case in the great shaft at the Watford tunnel, on the London and North Western Railway.

The porous character of the surface over a chalk district is found conducive to health; but means should invariably be taken to preserve it so by preventing the infiltration of liquid refuse from cesspools. The same refuse material applied judiciously over the agricultural surface, by irrigation, or otherwise, will be found to produce the most beneficial effects to the landowner and farmer.

The district around Dover is the lower chalk, which presents towards the sea bold and precipitous cliffs, 300 or 400 feet in height. There is no geological doubt but that the sea washed the face of these cliffs over most of the site of the present town and harbour, and extended inland up the valley for a considerable distance, in the course of the river Dour. Most of the present town and harbour, consequently, are constructed on an accumulated beach thrown in by the action of the tide, or the land has been reclaimed by the harbour walls and piers as they have from time to time been extended sea-wards. The dam of Arviragus A.D. 44, ruined the harbour it was intended to form; and in 1500 the harbour had again become useless. In the reign of Henry the Seventh fishermen drew their boats on shore and dried their nets, where portions of the town now stand. The Lord High Admiral inspected the harbour in 1581, and the old mariners could then remember when the sea washed the cliffs in Snargate-street; and they informed his lordship that "no beach had collected in the bay till the wall or pier was built on the west side of it, from Archliff fort."

Dover is situated on the north side of the Strait of Dover

in the English channel, with the North Atlantic Ocean to the west and the North Sea to the east. The site of the town and harbour is at or near the narrowest part of the strait, and, consequently, the tidal currents flow each way with an accelerated force, and the whole coast for several miles east and west is subjected to active sea waste and wear. The harbour-works at Dover in some measure protect the cliffs at this point, but, on either side, the wearing process is in active operation. For a considerable portion of the year the westerly and south-westerly winds prevail, and, consequently, the tidal action, influenced by these prevailing winds, is from west to east; and as the beach is composed of gravel, principally flint, termed "shingle," the waves striking the shore at an angle from the south-east, this shingle is driven up the sloping beach in a north-east direction, to be drawn by the retiring wave in a right line downwards from the shore, or almost due south; so that the shingle is carried eastward in lines, which saw-teeth will aptly represent. The rise of the tide is 19 feet on springs, and 11 feet on neaps. The chalk extends across the strait to the coast of France, and it is more than surmised by some geologists that continent and island formerly joined, at which period a bay would exist on each side this isthmus, and a much higher tide must then have been heaped upon the shores by the direct blocking of the main tidal wave, as seen at present in the bay of Fundy, the river Severn, and other places. This question may not be worth pursuing as regards the present inquiry; but a knowledge that the coast is what geologists aptly term a "wasting shore," and has been so for ages past, is of the utmost importance to the town, and must even influence any projected sanitary improvement, more especially as Government contemplates a large outlay on sea-works to form a harbour of refuge at this point. The fact that Dover Harbour has been extended seaward since the time of the Romans is no proof that the shore generally does not waste, because the contrary is a fact well established by an observation of the cliffs east and west. Any sanitary works now commenced should foresee and contemplate the growth of the town, and also have reference to past and present geological changes. The great accumulation of shingle which inevitably takes place where any obstruction is offered to its eastward motion is a serious difficulty, as connected with the harbour; the greatest amount of motion appears to take place in the shingle situated betwixt high and low water; the actual motion and effect upon it in deep water has not been so accurately observed. It is a problem yet to be solved whether the same action which preserves deep water in the strait will preserve a deep-water harbour. Should the accumulation of shingle from the westward fill out and round the new sea-wall, it must fall into the harbour mouth, and there accumulate, as in all former harbours.

MARKETS.—There are two markets in each week, held on Wednesday and Saturday. The butchers' shambles are held near the Museum; the butter market is held under it, and there is a fish market in Townwall-street. Saturday is the principal market-day, and is attended numerously by farmers and persons from the surrounding country.

GOVERNING BODIES AT DOVER.—The Municipal Corporation consists of a mayor, 6 aldermen, and 18 councillors. The mayor is chosen annually on the 9th of November by the Corporation. Three aldermen retire every third year, and their successors are elected by the Corporation. The councillors are elected for three wards, viz., Castle Ward, Town Ward, and Pier Ward, there being six councillors to each ward; two retire by rotation annually, and their successors are elected on the 1st of November by the burgesses of the respective wards.

There are six ward assessors and two revising assessors, as directed by the Municipal Acts.

The Commission of the Peace.—There are at present 13 justices appointed by the Crown; and in addition to those so appointed, the mayor and ex-mayor are justices *virtute officii*. Upon this body devolves the administration of justice, so far as petty sessions are concerned, within the limits of the borough.

The Court of Quarter Sessions is held by a recorder, appointed by the Crown; and the duties of the respective bodies are defined by the Municipal Act.

The Pavement Commission consists of the justices of the peace and 105 inhabitants: one-third of the latter retire annually, and their successors are elected by the rate-payers on the second Thursday in January. Upon this body devolves the duty of paving and lighting, and the regulation of hackney-coaches and of boatmen and porters for the purposes of the traffic: the two former are merely licensed; the porters are appointed annually by the Commissioners as well as licensed. There is no limit to the number of hackney-coaches and boatmen, so that they come within the range of the bye-laws ordained by this body under the powers of their Acts. These statutes are four in number, and are,—18 Geo. III. c. 76; 50 Geo. III. c. 20; 11 Geo. IV. c. 117; 5 Wm. IV. c. 47.

The Harbour Board of Commissioners consists of an honorable warden and 10 assistants.

The honorable warden is the Lord Warden of the Cinque Ports. His deputy, the Lieutenant-Governor of Dover Castle, and the mayor of Dover for the time being, are two of the assistants by virtue of office. The other assistants are gentlemen of the county: they must not be resident in the town and port. It is a self-elected body. It is said to owe its origin to a charter; but there have been several Acts passed confirming and regulating its powers and duties. Upon it devolves the

maintenance and regulation of the port, towards which it has certain estates, and the residue of the income is made up by port and tonnage dues levied by statute.

The Charitable Trustees were appointed under the Municipal Act: 11 were originally appointed. There are now one or two vacancies. Upon them devolves the care and regulation of the public charities, which are not extensive.

A Statement of the Particulars relating to Dover, in Kent, as required by the Circular of the Health of Towns Commission, dated 12th December, 1846. (Put in by the Clerk to the Commissioners.)

The Acts of Parliament for paving, &c., the town of Dover in Kent, are four in number, viz.:—

18th Geo. III. cap. 76, intituled, “An Act for better paving, cleansing, lighting, and watching the Streets and Lanes in the Town of Dover, in the County of Kent, and in the several parishes of St. Mary the Virgin and St. James the Apostle, in the same Town and County, and for removing and preventing nuisances and annoyances therein.”

50 Geo. III. cap. 26, intituled, “An Act to amend an Act made in the 18th year of His present Majesty for paving, cleansing, lighting, and watching the Town of Dover, and for removing and preventing nuisances and annoyances therein.”

11th Geo. IV., cap. 117, intituled, “An Act to amend two Acts of His late Majesty for paving, cleansing, lighting, and watching the Town of Dover, and for removing and preventing nuisances and annoyances therein;” and—

5 and 6 Will. IV., cap. 47, intituled, “An Act to alter and amend three several Acts for paving, cleansing, and improving the Town of Dover, and for making further improvements in the said Town.”

Object of Acts.—The object for which these several Acts were obtained is deemed to be sufficiently stated in their respective titles above set forth.

As to the District comprised in the Operation of Acts.—The district embraced in the above Acts, and over which the Commissioners exercise control, consists of the parishes of St. Mary the Virgin and St. James the Apostle; but there are powers given under the 5th and 6th Will. IV., c. 47, to extend the jurisdiction to the parishes of Charlton and Hougham so soon as any part thereof shall be paved, cleansed, lighted, and watched by the Board. The parishes of St. Mary and St. James comprise the principal part of the town as it existed several years ago; but it is now much enlarged, and Charlton and Hougham have become populous places.

Parts of Charlton and Hougham are lighted by the Commissioners under an order from the Town Council, made in pursuance of the Municipal Reform Act.

As to the Supply of Water.—The Commissioners have no authority under their Acts to supply any water; but there are two Companies which have pipes in the town and serve the inhabitants upon such terms as may be agreed on: they are not incorporated by Parliament for that purpose.

As to the Constitution of the Commissioners.—The number of Com-

missioners is 105, exclusive of the mayor and justices of the peace, 18 in number, and which last are Commissioners during their continuance in office. Of the 105 Commissioners, 35 go out of office annually in rotation, and the vacancies are filled up on the second Thursday in every January at an election holden for that purpose, at which all the inhabitants rated under the Paving Acts, and who have paid their rates, are entitled to vote.

The qualification necessary to constitute a Commissioner is the possession of 500*l.* of personal property, or freehold property in the town of the annual value in rent of 20*l.* above reprises.

Any vacancies in the Commission occurring between the annual elections through death, resignation, &c., are filled up by the body.

The Commissioners hold general meetings for the despatch of business at intervals of about three weeks, but a Committee for minor matters sits weekly.

Seven Commissioners present will constitute a general meeting.

The Commissioners have a clerk, surveyor, treasurer, rate collector, and messenger, or inspector of nuisances, and who are all paid officers.

The funds of the Commission are derivable from a duty on coals at 1*s.* 7*d.* per ton, and from a rate of 4*d.* in the pound upon the annual value of all houses, lands, &c., within those parts where the Commissioners exercise full authority. The gross income may be called 3,000*l.* per year, of which the coal duties give two-thirds, or 2,000*l.*

There is a bonded debt against the Commissioners of near 23,000*l.*, money borrowed for various purposes under the Acts, and upon which the Commissioners pay annually 4*l.* per cent. interest.

The watching which the Commissioners formerly superintended is now under the Town Council; but there has been no transfer of any duties or other power from the Commissioners to that body under 5 and 6 Will. IV., cap. 76, sec. 75.

A List of Places within the Municipal Boundary of the Borough of Dover, including the Parishes of Hougham, the Parish of St. Mary, the Parish of St. James, the Parish of Charlton, the Parish of Buckland, and the extra-parochial portion of the Castle, where Epidemic, Endemic, and Contagious Diseases, have of late prevailed.

In the Pier district—Round Tower-lane, Old Post-office-lane Lime-kiln-street, and courts adjoining. In the Town district—Worthington's-lane, Queen's-gardens, New-street, and courts adjoining. In Charlton—Barwick's-alley, Paper-alley, and the various streets here. This is by no means a full list of the names of places, which, if all were included, would be swelled out to an undue length. Dr. Soulbey stated that, in his experience, he found gastric and nervous fevers prevalent, as also small-pox, measles, and, every now and then, scarlet fever; "but the result which I observe most as the effect of ill-drained, ill-ventilated, or rather undrained and unventilated streets and courts, is a general cachectic condition of the inhabitants, predisposing them to any epidemic which may prevail." In

December the Doctor stated that cholera might be expected if things remained as they were; and, as shown by the returns, cholera has carried off its victims in Dover during this summer.

Dr. Soulbly has been unremitting in his endeavours, as a Dover Commissioner, to encourage cleanliness, and, where the local laws would allow, enforce a prompt and immediate removal of nuisances, for which he has been exposed to much personal annoyance and obloquy. It is most strange that, in this age, men should be exposed to insult, because they endeavour, voluntarily, to improve the condition and to preserve the health of the people. If personal and pecuniary interest could be supposed to enter into the calculations of those benevolent persons who are sincere sanitary reformers, the medical gentlemen, of all others, must necessarily be the most disinterested. But many persons are to be found who will not see any connexion betwixt dirt and disease. The medical gentlemen have, however, the fatal effects daily brought before them, and they know by education, and from experience, that the foul emanation is as certain and deadly in its effects as the most fatal poison of the chemist's laboratory. Because disease in its most appalling form is not always present in a town, the conditions capable of generating and fostering such a state of things are, by many, disregarded. Pestilence after pestilence sweeps through the country at intervals, probably wide apart, but each time the same disgusting, foul, and wretched state of neglected filth is there, to be worked upon by the exciting cause, until disease and death are concentrated, and radiated throughout the whole district.

In 1665 the plague raged in Dover with extreme violence, and upwards of 900 persons fell victims to it. The dead were so numerous that they were carted to a place of burial, some in coffins, but more without. Plague, it is well ascertained, always fastened with most fatal effect upon foul and dirty districts. The modern cholera is true to the same predilections. That more is involved in filth and neglect than mere bodily disease, the following letter will prove. There is a moral plague, constant in its action, fatal to individuals, and most injurious to society in its results. This letter of Mr. Pain speaks clearly to the great necessity which exists for sanitary improvement; it also points out to the rate-payer that this neglected state of things is pecuniarily most expensive. The largest portion of out-relief goes to the worst-conditioned places. The latter portion of this valuable letter is by no means the least important.

"SIR,

"Charlton in Dover, May 31, 1849.

"In reply to your letter of May 26th, I beg to inform you that the amount of out-relief for the parishes of St. Mary, St. James,

Charlton, Buckland, and Hougham, within the borough of Dover, amounts, weekly, to 65*l.* 17*s.* 10*d.*; monthly, to 263*l.* 11*s.* 4*d.*; annually, 3,419*l.* 7*s.* 4*d.*

"The total annual amount of poor-rate levied upon the above-named parishes for the year ending March 25th, 1849, amounted to the sum of 8,828*l.* 12*s.* 4*d.*; from this sum was paid the cost of the in-poor in the workhouse, and likewise a borough rate to the Town Council, as well as the out-relief.

"Of the out-relief, a large proportion goes to Round Tower-street and lane, and the low districts of the Pier generally; in the parish of St. Mary, to Barwick's-alley, Paper-alley, the old workhouse ground, including Colbran-street, Brook-street, and other similar places in the parish of Charlton; in Buckland, to a mass of wretched cottages called Manger's-rents,

"The largest proportion of out-relief distributed in the places above-named is caused by fever, small-pox, and other similar complaints, such being very prevalent in these localities; caused, I have no doubt, to a very great extent by the closeness of the buildings, and their filthy state, from want of proper drains and other sanitary regulations.

"From the experience of upwards of ten years' intimate connexion with the poorer classes, I have not the slightest hesitation in affirming that there is a most decided direct connexion betwixt confined districts, bad sanitary arrangements, and poverty and vice. In the districts above referred to, the moral state of the inhabitants is most deplorable; as the youth from these places grow to manhood they become habitual paupers; brought up to no regular employment, grossly ignorant and reckless, their time is spent between the Union workhouse and the gaol.

"In conclusion, I can only say that, if the Government wish to prevent the increase of a most debased and vicious population, they will take measures, if not to sweep away these nests of vice and disease already built, at any rate to prevent similar places from being erected in future.

"(Signed) S. M. PAIN, *Relieving Officer, Dover.*

"*Robert Rawlinson, Esq.*"

When it is so clearly proved that crowded houses, dirt, and foul districts have a direct connexion with heavy rates, it is not too much to presume that an improved condition, producing the opposite of all that now contaminates and degrades the populace, would remove much of the wretchedness and misery which exists, and also reduce the rates. Filthy, crowded dwellings generate and foster disease: labour is thereby prevented; poverty and misery is the consequence, and a direct money-charge upon the funds of the parish is the inevitable result. A saving of one-tenth the amount annually expended in outdoor relief would pay much of the sewer rate for the whole district inhabited by the poor of Dover.

EXCESS OF MORTALITY IN DOVER, ABOVE ELHAM AND BRIDGE, BASED ON THE CENSUS OF 1841.—The following view of the

rates of births and deaths amongst the populations in the districts named is made up from the returns to the Registrar-General during the year 1841. In well-drained, well-cleansed, and well-ventilated public establishments, typhus and other diseases are rarely found to arise, and when they do arise are much less fatal. The great mass of this class of deaths is proved to be preventible. The health of populations in well-drained, well-cleansed town districts have, in particular instances, been increased beyond the average of rural districts; and it is possible that all may be greatly advanced. The rate of mortality in Elham and Bridge is much higher than classes in good physical circumstances are known to attain, namely, upwards of 52 years for all born. The pecuniary consequences of the preventible excess of deaths are set down as an average expense of at least 5*l.* for each funeral; but beyond this it is found that, for every death in excess, there has been at the least 28 cases of sickness in excess, the expense of which cannot be less than 1*l.* per case; beyond this the premature death of an adult labourer involves a loss of productive labour averaging not less than 10*s.* per week for each male and 5*s.* for each female, or 7*s.* 6*d.* per week male and female, which, for all classes, skilled and unskilled labourers, will be a low average loss beyond the prime cost of their maintenance. The more the facts are examined, the more it will be found that there is no larger economy than in well-directed sanitary means of prevention, and that the pecuniary losses hereunder set forth as resulting from preventible causes of disease are greatly underestimated.

Population Elham and Bridge, 25,643; Dover district, 24,522.

Total number of deaths in Elham and Bridge in the year 1841 was 399, in Dover 487. Total number of births in Elham and Bridge 793, in Dover 796. Proportion of deaths in Elham and Bridge 1 in 64, in Dover 1 in 50; proportion of deaths of infants under one year of age, Elham and Bridge 1 in 12, in Dover 1 in 8; proportion of deaths from epidemics, Elham and Bridge 1 in 475, Dover 1 in 292. Average age of all who have died, Elham and Bridge 37 years 5 months, Dover 30 years. Excess in number, all deaths 106, of adults 17. The number of years' loss of life to each individual in Dover is 7 years 5 months, to each adult 3 years 4 months. To the community, loss of money, value of productive labour, in Dover, to each adult is 65*l.*; loss by preventible sickness, 2,968*l.*; by funerals, 530*l.*; of labour, 15,990*l.*: making a total loss of 19,488*l.* The approximate proportion of life lost by each person in Dover is one-fifth.*

* Extracted from Reports and Tables published by the Health of Towns Association.

PRESENT WATER SUPPLY.—Dover is at present partially and most imperfectly supplied with water from several independent sources. There are two water-works, and there are also public pumps, water-carts, private pumps, and private wells.

The Water-works are known as the *West Dover Water-works*, situate in *Limekiln-street*—this is the property of Mr. Joseph Walker, oil merchant; and the *East Dover Water-works*, belonging to the *Gas Company*, which are situated close to the gas works. Both pump from wells sunk in the chalk; both are limited in their operations to the best class of houses, and neither are capable of supplying the houses in the higher parts of the town. Complaints were made that the water from the West Works had been tainted with oil, and it was proved in evidence that an oil barrel or vat had burst and allowed the oil to run into the well. The water at the East Works is raised into a tank or reservoir in the face of the adjoining cliff, 74 feet above the level of the sea. The engineer could not tell the quantity supplied, or the price charged, but he stated that the Works could yield about 100 gallons per minute; and that they were preparing to increase this quantity. Neither Works have an Act.

In August of 1848 a fire broke out in Mr. Gay's mustard manufactory, when property to the amount of 4,000*l.* was destroyed, the greater portion of which might have been saved if there had been fire-plugs in the vicinity.

The rates charged for water by these Works appear to agree with each other, and are regulated in some manner, but apparently not according to the rental; for a house of 115*l.* a-year pays 2*l.* 2*s.*, and one of 80*l.* pays the same; other houses, rated at 105*l.*, pay 2*l.* 12*s.* 6*d.*; and one of 165*l.*, 3*l.* Cottages are not supplied.

PUBLIC AND PRIVATE PUMPS AND WELLS.—There is a market pump, from which the houses of the surrounding district are supplied; and the sailors from the harbour also resort to it. This pump was complained of as creating almost an intolerable nuisance. During the summer of 1848 the harbour was comparatively full of foreign vessels, and this pump was surrounded by the sailors for hours at a time, to the exclusion of every female belonging to the town; but it was stated to be in general crowded, and the cause of much scandal and obscene language, as female servants, obliged to go to it, are exposed to the rude remarks of sailors and others frequenting the quays and harbour.

The private pumps and wells were in general complained of; some were said to rise and fall with the tide, and were consequently brackish; others were said to be foul and unfit for use by infiltration from cesspools and grave-yards. I visited one court in Grubbins'-lane, which was in a very filthy condi-

tion. There was an open draw-well in this court. I asked a boy who was there to draw up a bucket full of water; and I found from its appearance that it was not fit to drink. On my remarking that it was very dirty, the boy said, "Yes, sir; but in summer it has maggots and worms in it in plenty." The following remarks were handed in by Mr. Bottle, during the inquiry:—

"SIR, "37, Town Wall-street, Dec. 6, 1848.

"I AM desirous of submitting to you as evidence bearing upon the present preliminary inquiry under the provisions of the 'Public Health Act,' that I have had repeatedly specimens of well water brought to me for professional examination from various parts of the town in consequence of their having become unfit for domestic use. In the majority of cases I have found the cause of complaint owing to the presence of nitrogenous organic matter giving off the obnoxious gases peculiar to the decomposition of animal and vegetable substances, derived from some cesspool injudiciously constructed within a very short distance of the well, and in one case I had good reason to suspect the close approximation of the burial ground of St. James's church was the contaminating source.

(Signed) "ALEXANDER BOTTLE.
"Operative and Pharmaceutical Chemist."

PRESENT CONDITION OF TOWN SEWERAGE AND DRAINAGE.—There is no general and combined system of sewers and drains in the town and suburbs. Isolated sewers and drains do however exist, but even these are frequently most imperfect in form, arrangement, and size. Many of the best houses stand over a cesspool or cesspools, into which all the refuse of the house and water-closets is passed. The cottages generally have an open tub placed under a privy seat, and this is emptied at intervals during the night, into a scavenger's cart sent round the town for the purpose of removing such accumulations, a process, it must be observed, which is most expensive, inconvenient, and repulsive to the feelings of many of the inhabitants, as will be seen by their evidence.

With regard to the existing sewers the surveyor states in a Report made to the Commissioners:—

"The present drainage is, in its arrangement, destitute of system, and in its construction and level, extremely defective. The drains are for the most part square on section, and have flat bottoms of loose bricks. In many instances these drains are covered with planks which are now in a state of decay, and are therefore exceedingly dangerous. A drain of this description gave way a few days since in Limekiln-lane, when the surface of the street fell in and choked up the drain. But this is not a solitary instance, neither is it confined to the wood covering, as the same thing happened a short time ago to the upper part of this same drain where it was covered with stone. Another instance of defective construction may be given. A brick sewer com-

mences with an internal section 2 feet high by 1 foot 8 inches wide, passes under a house in Oxendon-street with an increased section of 3 feet high and 2 feet in width, crosses the road, and increases to 6 feet high and 4 feet wide, of which dimensions it is carried under ten houses, when it is diminished to 3 feet in height and 1 foot 6 inches in width, the sides are vertical, and arched over, but the bottom is wholly in ruins. This sewer passes into an immense brick vault under Hawkesbury-street, 30 feet wide and 8 feet high, with a rugged bottom of the natural earth, which is covered to the extent of 1 foot in depth with decomposing filth of the most noxious and dangerous nature. The first outlet from this vault is 5 feet 6 inches high and 3 feet wide, which is diminished to a barrel-drain 18 inches in diameter, and is finally continued under a portion of the dock works by a square iron funnel down to low water line, where a clumsy iron flap is attached, originally intended to prevent the tide flowing up the drain, which purpose, however, it does not answer, as every tide passes freely up, and stands at times 6 feet deep under the houses in Hawkesbury-street. The soil in the sewer is also driven back to the upper end, and the offensive smell up the collateral drains through the gully-grates into the streets. This is the main drainage of the pier end of the town. The gases generated in this sewer are of such a nature that when the foreman passed through with me the silver watch in his pocket was turned to a mahogany colour. The effluvium from this place is constantly evaporating, and every tide forces it up through the street and yard grates of the district. The parties who inhabit the district are sickly in appearance, and state that at times the smell quite takes away their appetite. There are 14 houses built directly over this large cesspool, in which a solid accumulation of refuse takes place annually, amounting to 218 tons. The drains which exist at the pier end of the town are constructed of brick, and have 16 separate outlets, either into the dock, harbour, basins, or pent. The drain in Snargate-street has four different and opposite inclinations, which renders it necessary to have three separate outfalls into the pent; the one under the bazaar is constantly choking up, and is also in a very dilapidated state."

Many of the houses which abut on the river and pent, either drain independently into them, or have privies erected over the side, and the refuse is constantly carried down into the pent and harbour, creating a nuisance offensive alike to sight as to smell. There are private drains made at a considerable expense which terminate in cesspools; and some drains have several cesspools in their length. These drains are of brick, and have been made at great expense. Those from Liverpool-terrace are 2 feet 6 inches in diameter, and with their cesspools must have cost nearly 10s. a lineal yard. A 6-inch pipe would much more effectually drain these premises, at a cost not exceeding 3s. a-yard.

The following extracts are taken from my notes of the evidence, which evidence was voluntarily tendered in public. It is broken up by comment where I have considered such necessary.

Mr. Edward Sell, hosier, stated:—

"I reside in Bench-street. There is a barrel-drain down this street about 3 feet below the street surface, but it will not drain my cellars, or take away the overflow from the cesspool, but I have this pumped out at great risk and inconvenience. I have two water-closets on the premises, one of which empties into a cesspool which is obliged to be pumped out twice a-week by a man at a cost, not less, certainly, than 8*l.* 10*s.* per annum. If the pumping of this cesspool is neglected it overflows the cellar and creates a great nuisance. I have had a great deal of sickness in the house from time to time. It is against the rules of the Commissioners that a water-closet drain should be entered into the sewers, but I have put one pipe into the street drain from my upper water-closet contrary to regulations. The public drain is not capable of draining my cesspool and lower water-closet by a depth of 5 or 6 feet."

It will be observed here that Mr. Sell is obliged to submit himself to a voluntary taxation of 8*l.* 10*s.* a-year merely to keep down a dangerous and most intolerable nuisance, which, besides its inconvenience, generates "sickness." A payment of 3*l.* 10*s.* a-year represents, at 7½ per cent., a capital of 113*l.* 6*s.* 8*d.* This would perfectly drain many such houses, and fit up a complete water-closet to each. The extra cost of "sickness" cannot be estimated.

Edwin James Dixon, shomaker, residing at No. 5, Worthington's-lane, stated:—

"There is a surface-drain down a portion of this lane, but there is neither sewer or drain to my house. There is a privy within 18 inches of the kitchen window, the smell from which is very offensive, and there is a cesspool on some premises in York street, the material from which has to be pumped up twice or three times a-week, and it runs over the surface, causing a dangerous nuisance. My wife died last Easter, but previous to her death she had always sickness and severe head-ache when the cesspool was being pumped out. I and my whole family suffer from the same cause at present."

This witness, who was a working man, stated that he would gladly pay a moderate rentcharge to have perfect drainage and sewage.

Mr. William Metcalf, linen draper, residing in Bench-street, stated:—

"There are no drains at my house, but into a cesspool on the premises, which I am obliged to have pumped once a day at least, frequently two or three times a day; this cesspool is about 15 feet deep, and we cannot keep it emptied, as it fills partially from the strata. If the pumping is neglected, the cesspool overflows and floods the kitchen, when the smell is most horrible. This pumping costs me at least 2*s.* a day. I would not find the labour for any other person for the 2*s.* a day. Besides this expense, the cesspool costs 3*l.* or 4*l.* a year in repairs, probably more, as it and the pump are continually out of order. There are open privies next door, close against my kitchen wall, and the material drains through. I have had the wall cemented, but to no effectual purpose. The Com-

missioners have objected to my drains being connected with the public sewer, but even these are not deep enough to drain my premises. About 24 persons reside on my premises, and we all suffer more or less from the existing nuisances."

It will be seen that Mr. Metcalf pays a direct taxation equal to 40*l.* a year, and suffers from an intolerable nuisance, from which this enormous payment cannot free him. 40*l.* a year represents, at $7\frac{1}{2}$ per cent. per annum, a capital equal to 533*l.* 6*s.* 8*d.*, or a sum which would perfectly drain a district of houses, and fit up a complete water-closet in each. The $7\frac{1}{2}$ per cent. allowed would pay interest if the money were borrowed, provide for contingencies, annual repairs, and accumulate a sinking fund to liquidate the debt in 30 years.

Mr. Edward Seward, linen draper, resides next door to Mr. Metcalf. He confirmed the evidence of Mr. Metcalf, and complains of the nuisance caused to himself by the pumping from the cesspools. "Would be willing to bear a due share of the expense to have proper drains and sewers."

This evidence is worthy of particular consideration, as it shows in a very strong light the enormous charges individuals have to subject themselves to, merely to abate and keep down in a most imperfect degree, a nuisance they have no power to free themselves from.

Decimus Humberstone, residing at No. 6, Portland-place, stated :—

"These houses have cellars, but no drains ; there is an open channel at the back. There are about 10 cesspools and privies on the premises, which must be emptied by hand ; every drop of water made in the cellar must be carried up the steps. Would be glad to pay 1*s.* 6*d.* a week for proper drains, and to be free of the cesspool nuisance."

Mr. Humphrey Humphries interrupted the witness, and asked if he had ever complained to the Guardians. The answer was—

"No, but I would have complained if they could have helped me. I come here because I expect the Public Board of Health can help me, by my paying a fair share for the work to be done."

Mr. Rowland Rees, architect, appeared at the request of Mr. M'Cloud, of No. 17, Bench-street, who was too unwell to attend. Mr. Rees stated :—

"I have examined the premises, and find the base of the house, under the floors, saturated 12 inches in depth with soil of the most horrid kind, which the imperfect drains cannot remove, and our local Acts afford no remedy. I told Mr. M'Cloud I was not surprised he should be unwell, but I was surprised that he should be alive in such a place. Any reasonable charge for perfect drains would be most willingly submitted to."

C. B. Wilkins, Esq., magistrate, resides in Liverpool-terrace, and stated :—

"The whole of the soil from this terrace is deposited in cesspools, as there

is not a common sewer near the place. When these cesspools have to be emptied, there is great inconvenience and nuisance from the sight and smell of the refuse. I would most gladly be at any reasonable expense to have proper drains. My next-door neighbour, Colonel Smart, is also suffering great inconvenience from the want of sewers and drains."

Edward Poole, Esq., justice of the peace, owning premises situated in Snargate-street, states :—

"There are no drains here, but two cesspools on the premises. I would gladly pay to be free from them ; they are a very great nuisance, the smell is continually offensive. I also own four houses opposite, none of which have anything more than 'tubs,' but I would most willingly build water-closets at my own expense, supposing there was the means of drainage."

These complaints might be considerably lengthened from my notes, as all classes attended the inquiry voluntarily, and tendered their evidence most freely. There seemed to be a strong feeling of satisfaction that Government had taken the matter into its consideration, and that the construction of proper sewers and drains should be made imperative. Some persons insisted upon the possibility of owners of property doing the necessary work without any general Act ; but parties cannot mutually agree to do the necessary work, and if there is at times a concession made, it is frequently at a most oppressive cost, as shown by the following evidence.

Mr. Henry Hughes, of King-street, Market-place, linen draper, stated :—

"On the west side of this street there are no drains, and all the water from the kitchens has to be carried up a ladder 10 feet in height to be thrown into a surface-drain, at an expense to me certainly not less than 10*l.* or 12*l.* a year. There is a private drain into which I pass a water-closet-pipe, for the use of which drain I pay 2*l.* a year, although I constructed the drain at a cost of 6*l.* or 8*l.*, but pay the annual charge to pass through another person's property ; and if he thought fit to charge 5*l.* a year for this right, I must pay it. I own a house which I do not now occupy, and which I cannot let for want of proper drainage. I would not object to take 50*l.* a year for this house in its present condition, but I should readily get more by 10*l.* or 20*l.* a year if there could be proper drains and water-closets put in. - There are several houses in the same row in the same state, at rentals varying from 60*l.* to 100*l.* a year. We have continued to pay heavy rates, and yet have not the required sewage accommodation. I wish to have the Public Health Act applied, that we may have proper sewers and drains constructed at a reasonable cost."

The annual expense to *Mr. Hughes* would most effectually drain several such houses as the one he occupies. The following evidence traces the effect up to the cause by direct experiment, and is therefore worth the notice of those in Dover who wish to deny the necessity for any improvement.

Mr. Parker Ayres, stated :—

“I have premises in Queen’s-gardens. I lived in this house five years, during which time myself and family were very ill. There was a well and a cesspool within a diameter of 10 feet. We used the water from this well. I did not at first trace my household sickness to the imperfect drainage and bad water until a friend pointed this source out to me. From the constant stench in the house, and the illness of my family, I determined to build myself a house where I could have drainage, and since I have removed into it the health of myself and family has gradually improved. The person who occupied the house after me was taken unwell after being there two months. I told him my reasons for leaving, and he at once left the place, and has been well since.”

The want of sewers and drains is particularly felt to be a grievance by the poor, who have nothing but “tub” accommodation. This apparatus consists of an open tub, placed under a privy seat, the evaporation from which is constantly passing off. A cart is sent round in the night by the town authorities to remove the contents of these tubs, which have to be carried through the house in many instances; and the great complaint is the expense of sitting up, burning coal and candles, until past midnight, waiting for the cart, then having to pay the nightman a penny or twopence *not to forget to call*, and the smell of passing the tub through the house was said to be most offensive. One female, a labourer’s wife, stated that she frequently had to set doors and windows open to drive out the stench before she could go to bed; and she expressed her gratitude in the strongest terms at the prospect of the General Board of Health assisting her to a more healthy and agreeable state of things. The town authorities pay for this work being done; but the cottagers stated that if they did not also pay the penny the men would “*forget to call*.” Mr. Humberstone stated, “The night-carts are a very great nuisance. I have necessarily been much out in the night, and have consequently seen and felt more of them than most people. The smell from them through a whole street is most abominable. I have frequently been obliged to light my pipe to get past them.” It was a subject of general complaint amongst the inhabitants of cottages that they could not of themselves escape from this horrid tub nuisance. The surveyor stated that three men were employed for this work throughout the whole town. That the number of tubs in use might be from 300 to 400, but that not more than 100 were removed with anything like regularity; the others were emptied by the people on to the nearest midden, or out into the street channel, or over the surface of the nearest waste ground or open space. The men employed upon this work were said to be frequently ill from the effect of the gases; and one of them, John Hammond, was said to be laid up sick at that time. The statement that the nightmen make their memories convenient,

though paid by the public for their work, was confirmed by Mr. Charles Benjamin Gorely, scavenger, who most emphatically stated that he had known these men obtain as much as their wages by these indirect means.

Many of the inhabitants of the better-class houses not only suffer from a want of drainage themselves, but they also find great inconvenience from the undrained cottage property in their immediate vicinity. *Mr. Edward Knocker*, solicitor, resides on Castle-hill, and although his house is cut off from the adjoining cottages by a wall and yard, yet he stated that the smell from the cesspools and tub nuisance of these cottages is frequently so bad that "I have to order all the windows in my house to be closed on the side towards which the wind is blowing. I believe I have myself been made very ill by the smell." I examined the district in company with Mr. Knocker and Dr. Soulby, and found the sanitary arrangements very deficient. The cottages are crowded together, the yards are confined, there are no under-ground drains; imperfect surface channels only exist; and the inhabitants pass their refuse into cesspools, or use tubs. Some new cottages were near completion, and the owner stated that he would most willingly drain his property if he could do so. Not only is the owner of cottage property prevented doing the work necessary for the health and comfort of his tenants, but the owners of first and best class houses are in the same condition. Houses have been most imperfectly drained, and in a most objectionable manner, and at an enormous cost, as is shown by the following evidence. *Mr. William Huntley* stated, "that 29 houses in Waterloo-crescent, fronting the sea, each letting annually at rentals varying from 120*l.* to 180*l.*, had been drained at a cost for the largest houses of 60*l.* each house. The main drain is of brick, circular in section, and is from 5 feet to 6 feet internal diameter." And this enormous drain passes the sewage it receives into the centre of the Pent, the mud-banks of which are exposed during the greater portion of each day, as each tide only covers them during high water, to fester and evaporate gases from their foul coating until high water of the next tide. Dr. Soulby stated that the filthy condition of the mud-banks in the Pent caused much sickness in the town.

The following evidence of *Mr. Bolton* is only another form of complaint, showing, however, how much even the most enlightened and educated are compelled to suffer in their own persons and by their servants for want of public and general sanitary arrangements:—

"I have lived in this house about 12 months, during the greater portion of which time there has been water in my cellar to the depth of several inches; there is no means at present accessible for draining it off; the effluvium arising from the decay of matter it contains is at times

very noxious, and almost unbearable; there is a privy or vault at the back of the house and attached thereto in a very confined position, and is a source of annoyance to my neighbours as well as myself; the health of my servants suffers much from the above causes; that many have been obliged to leave my service from inability to perform their duty through sickness, superinduced, I have no doubt, from improper drainage; that one of my servants was taken ill and died in my house about five months since from fever, and I consider she was predisposed to attack from the nature of the circumstances of the house, and that her death was in a measure attributable thereto. It is right, also to state that this house has, I find, been looked upon as unhealthy for a number of years; the same events, both as to illness and death, having occurred to the servants of my predecessor."

The following evidence of *Dr. Soulby* is peculiarly valuable, as he has paid an earnest and deep attention to the whole question of sanitary reform, and his opinions necessarily carry all the weight of his profession. He stated "that his own private residence, which may be said to be in the best part of the town, has no drainage whatever; there is a cesspool close to the house, which receives the night-soil from a watercloset and servants' privy, the bottom of which is *beach*, and is about 18 inches below the level of the basement floor of the house. There is a smaller cesspool under the scullery, which receives the scullage water. Independent of the nuisance and annoyance of emptying these cesspools, the expense averages from 8s. to 10s. a-year. There is a well; but from its situation, being surrounded by cesspools, the water is unfit for use, and water is supplied from the East Dover Waterworks at a cost of 2*l.* 12*s.* 6*d.* a-year. The rent paid to the landlord is 90*l.* a-year, the tenant paying all rates, taxes, repairs, and painting. This may be taken as the condition of the whole of the Marine-parade and Lawns. Dr. Soulby, as physician to the Public Dispensary, states that he has had several cases of fever, with gastric disturbance, during the last three months, which he believes to have been excited by local causes, that the generality of cases presenting themselves at the dispensary are of a cachectic character, and evidently dependent upon living in close ill-ventilated houses, where there is no drainage; in many cases the refuse water and sewage of three, four, or more houses is brought through the passage of another house in a drain which is imperfectly covered by boards, and gives out a horrible stench. Some parts of the town are below the level of high water; and the tide occasionally drives back the contents of several *large* cesspools through the drains into the streets and houses, and he has been obliged to cross the ground-floor room upon chairs into the staircase (the water running over the sill of the door) to see patients. As a commissioner of pavements, and one known to take an interest in the sanitary condition of

the town, he has received numerous complaints as to the bad condition of surface drains accumulation of filth, and the inconvenience and annoyance arising from the complainants having no other *necessary* convenience than a *tub*, to empty which, in accordance with the regulations of the commissioners, they must sit up till after 11 o'clock at night; many persons, however, will not do this, but empty them into the gully-holes, thus converting these places into open cesspools, which are always offensive, and which no trapping can remedy. The gully gratings are also made deposits for the offal of fish and other animal and vegetable refuse thrown out from the surrounding houses, and it costs the town at least 50*l.* a-year to empty them."

During the progress of the inquiry I stated that I would receive written communications from any parties who wished to offer such evidence, and several statements and reports were forwarded in consequence; I have given several of these statements and reports entire as I received them. The following statement by Mr. Edward Elwin is important, as showing the disposition and wish of a ratepayer and owner of property to possess the means of carrying out proper sanitary regulations. There are others of an opposite kind, and one from certain persons in the parish of Buckland, wishing to have that parish excluded from the operation of the Act:—

" 35, *Castle-street, Dover*,
Dec. 7, 1848.

" SIR,

" As I understand you will receive a written communication respecting any particular part of the town, I beg respectfully to call your attention to the case of a house, No. 28 in Castle-street, which partly belongs to me.

" This house was first occupied by myself in May, 1835, and for a few years the well and cesspool, or vault, seemed to answer pretty well, but through want of proper sewerage, and the contents of the vault oozing through the ground and contaminating the well, the water became so bad that in 1839 we had another well made at a cost, including extra length of pipe, of 16*l.* 10*s.* or upwards; this was at the end of the garden, and, as we thought, at a safe distance from the vault, the bricklayer leaving the old well to be used as an additional cesspool; this answered for a little time, but now again during the last year complaints have been made that the water from the present well is very offensive, owing doubtless to a similar cause as before affected the first well. I may further add, that owing to want of proper sewerage the vault requires to be frequently emptied; it was emptied in May, 1847, at an expense of 1*l.* 10*s.* 6*d.*; it was again emptied last October at a like expense; and each time to the great annoyance and inconvenience of my tenant and her lodgers, as the offensive matter has all to be carried through the house.

" We thus have been paying in a pecuniary point of view (to say nothing of the *time and trouble, and ill effects* attending it) a consider-

able tax, amounting, I should suppose, to an average of at least 2*l.* a-year, all owing to want of proper sewerage; and I doubt not that some other houses at the upper end of Castle-street have been similarly situated.

"My tenant has also to-day called upon me to apply to have a water-closet built, which I have intimated my willingness to do as soon as we can be provided with proper sewerage.

"I may also state that my next door neighbour, Mr. Docker, of 34, Castle-street, a few weeks ago stated to me that he was going to make another cesspool in his garden, as he thought his present one was full, but I advised him to wait, in hope that before long we should be supplied with proper sewerage, which we so greatly need.

"I may also mention the case of a friend of mine, who used to occupy one of the houses in East Brook-place, whose cesspool required emptying, I think, about once in eight months; and I am myself interested in several other houses in Dover, in all which I am subject to this expensive and very disagreeable tax; and of course it is a fact that these expenses I allude to, so far from enabling us to get more rent for the houses subject to it, operate unfortunately quite in a contrary manner; the cause of the expense being also a great injury and inconvenience to the occupation of the houses.

"I must apologise for thus troubling you, and beg to subscribe myself,

"Sir, your obedient servant,

"EDWARD ELWIN.

"Robert Rawlinson, Esq.

"P. S.—I do not wish to prejudice my own property, but it appears but right also to add that my tenant, of No. 28, Castle street, stated, that lately in pumping up the water she sometimes pumps up *maggots* and *worms*, and she promised to bring me some to satisfy me that such is the case."

The following report is the result of a personal inspection induced by the evidence and proceedings at the inquiry:—

"Alfred Page, brewer, Dover, begs to present the following report:—

"Tuesday, December 5.—Took a survey, commencing with Finnis' Hill, where there are from 30 to 35 houses wholly unsupplied with good water, and having no other privy conveniences than *tubs*, which are mostly within 5 feet of the sitting rooms; a pump is placed in a yard of one of the houses, of which the inhabitants in that locality can avail themselves at a charge of 1*s.* 6*d.* per quarter, but the water at some periods is so indifferent that they cannot then use it. The house where the pump is situate has the place of convenience "*tub*," in the wash-house from want of yard room (the pump occupying its place). Having no cupboards, the occupiers of this house are obliged to place their eatables in this wash-house. Three men and a family of six children occupy this house. Afterwards visited Queen Elizabeth-square, where there is a house at a rental of 16*l.* per annum with no better convenience than a *tub*, and no water supply. In several of the houses adjoining, the places of convenience are in one corner of what I considered to be a kitchen.

Afterwards visited Old Post Office-lane, Water-lane, and Spring-place, which were, generally speaking, in no better condition, being destitute entirely of water. From thence proceeded to Round Tower-street, in which the houses (with two or three exceptions) have no water on the premises, and with no better conveniences than *tubs*. I must here observe a great nuisance arising from a dung-heap at the back of the London Hotel, many of the inhabitants in this district depositing the contents of their *tubs* on this heap, to the great annoyance of the neighbourhood. Afterwards visited Round Tower-lane, in which the same horrible state of things exists. In conclusion I would beg to observe, from the inadequate supply of water afforded by the works, and the impurity of the wells and pumps, we give to the inhabitants of our own immediate neighbourhood a quantity weekly of 1,500 gallons (at a moderate computation), the whole of which is raised by horse-power, and if we were to refuse this supply it would be severely felt by the poor inhabitants in the neighbourhood.

“ (Signed) ALFRED PAGE.”

In accordance with the instructions of the General Board I communicated with the local clergy, and am happy to state that I received every information and assistance I desired. The letter of the Rev. Frederick W. Darwell not only points out the demoralizing effect of neglect and dirt, but he also indicates the alarming and revolting nuisances attendant upon a crowded grave-yard:—

“ *St. James's Parish, Dover,*
Dec. 14, 1848.

“ SIR,

“ I HAVE the honour to acknowledge your letter of the 11th inst. I do not know that I can add anything to the statements I have already made to you of my conviction that better sanitary regulations would tend very materially to improve the habits of the people. My own observation and experience in visiting among the poor tend most decidedly to confirm the evidence to this effect, which has already been very copiously laid before the public. The poor man when fatigued cannot be expected to remain in his house, if his wearied senses are to be oppressed by noisome stench and disgusting objects. He naturally seeks the beer-shop as a refuge, and his wife and family are left to seek relief under such circumstances as they may. Thus the domestic bond is loosened if not severed; he ceases to regard his family, and they cease to respect him, and so a generation of reckless and unprincipled persons is by these means turned out upon society. It is quite unnecessary for me to add more on this head.

“ I am, however, requested by the rector, the Rev. Thomas Morris, (whose infirm state of health precludes his entering into the subject with you himself,) to draw your attention to the state of the St. James's churchyard, which has now for some time been so full as to be used only with peril to the populous vicinity in which it is placed. Two years ago the facts averred by the sexton before a meeting of the inhabitants were as alarming as revolting; but though a committee was appointed, the expectation of a Government measure prevented their proceeding to the purchase of additional ground. Should you not have ample evidence on this head, I would especially direct your attention to pro-

curing it, for I must say that my own painful observation of the way in which the remains are early disturbed convinces me that it is a point which requires the most prompt remedy.

“ (Signed) FREDERICK W. DARWELL,

“ *Curate of St. James’s, Dover.*

“ *Robert Rawlinson, Esq.*”

The following letter from the Rev. John Puckle is also clear and distinct as to the connexion which is to be traced betwixt filth and immorality. It is a fact well known to every intelligent medical practitioner, that where fever is surrounded by foul cesspools and other causes which engender it, the hope of a cure is reduced to a minimum; but if by any means the patient can be removed to an atmosphere comparatively pure, a speedy restoration to health is almost a certain consequence. And so, no doubt, it will be found with the moral health of a people. The minister preaches and warns in vain to a crowd of human beings compelled by the force of circumstances to live without even a show of decency or modesty. Father, mother, sons, daughters, and frequently adult male lodgers, nightly crowd the same room; the young know and learn vice to the exclusion of every other knowledge; the world is, for children so educated, one vast theatre in which to practise iniquity and deceit. This alone is, to their practised senses, a reality; home, comfort, peace, and hope, are but the visions of a dream, or they are words without definite meanings.

“ *St. Mary’s Parsonage, Dover,*
December 21, 1848.

“ MY DEAR SIR,

“ I BEG leave in writing to confirm the testimony I gave you verbally when you were at Dover.

“ From a ministerial experience of 13 years,—first in a parish of 7,000 souls, then in a parish of 20,000, and now in a parish of 10,000,—I am perfectly satisfied of the close connexion subsisting between the sanitary and the moral condition of our poorer classes. I trouble you with no reasons (which you do not need), but merely state my conviction. At Fulham, Maidstone, and Dover, I found, *without any exception*, the worst demoralization in the worst constituted dwellings and neighbourhoods, the one being traceable from the other directly as effect from cause. To what extent we may ever succeed in raising the moral tone of our poor people’s habits of life time only can show; but I affirm in conscience, that to raise them, while they live in such places and under such circumstances as they do now, *is impossible*. No sense of decency or self-respect can struggle against the difficulty; and the chief force of our pastoral ministrations is rendered nugatory wherever such difficulty either is not, or cannot be, to a certain extent done away.

“ I may add that I have very rarely met with a parish priest, accustomed to minister in a large town, who has not fully felt the same conviction.

“ Hoping sincerely that the poor of our flocks may soon feel the benefit of such labours as your Board contemplates,

“ I remain, my dear Sir,

“ Yours very faithfully,

“ *Robert Rawlinson, Esq.*

§c. §c. §c.

“ JOHN PUCKLE,

“ *Incumbent of St. Mary's, Dover.*”

OPPOSITION TO THE ACT.—I have previously stated that during the inquiry there was a show of opposition. Mr. Robinson, auctioneer, and one of the local Commissioners of Paving, presented a petition against the inquiry, signed by about 40 inhabitants. He said the town generally was considered very healthy, and did not require the application of the Act; and, in evidence,

Mr. John Sims stated :—

“ I am proprietor of three lodging-houses situated on the Marine Parade, and during the last 23 years have had 173 tenants, some of them members of the aristocracy, and some wealthy commoners, not one of whom ever complained to me of the unhealthy state of the town. Some have repeatedly occupied my houses. I never had a death in any of them, but many have been restored to health. I consider the town in a perfectly healthy state, and that the Public Health Act is uncalled for.”

Mr. John Sims was afraid that to speak of dirt and disease as existing in any portion of the town would injure his property, by preventing visitors seeking the benefit of the sea air. The poor might remain in all their filth and wretchedness, so long as wealthy lodgers paid for his houses; but it will be found in the general evidence that even Mr. Sims's property is involved in the common difficulty, having nothing but the cesspool nuisance, of which so many complaints were made. Mr. H. Humphreys and Mr. W. Huntley, surveyor, also spoke to the complete state of their property.

Mr. John Baker, of the parish of Buckland, in the borough of Dover, urged the following reasons for wishing to exclude that parish from the benefit of the Act :—

“ I carry on the business of a box-maker, as well as that of an accountant. I am one of the overseers of the parish of Buckland, where I have resided the last five years; and at the request of the Superintending Inspector I furnish him in writing the following evidence on the subjects of his present inquiry, so far as the same applies to the parish of Buckland.

“ *Sewage, Drainage, and Supply of Water.*—The inhabited part of Buckland consists almost exclusively of one street, formed by dwellings on each side of a portion of the turnpike road from Dover to Canterbury, passing along the side and near the foot of a hill during its whole course; and a considerable stream of water, called the river Dour, runs along the whole length of the street on the north-east side. The stream, as I have learned from a professional surveyor (Mr. Small, of Buckland), has a

considerable fall, and of course flows rapidly in its passage through Buckland; that the natural position of Buckland-street, with the assistance of good drains in the turnpike road, prevents any surface water remaining, it being instantly conveyed to the river; that the house drainage is principally by means of cesspools, but many houses drain and sewer immediately into the river; that the supply of water is exceedingly good and pure from wells and pumps,—not a house, I believe, but has one, or the free use of one; that the wells on the south-west side of the road, being more on the hill, are deep (viz., from 15 to 35 feet, sunk into the chalk which forms the hill); those on the north-east side are necessarily not so deep, from their proximity to the river, and the water is extracted from a more alluvial soil. I wish also to observe, that from the circumstance of Buckland not being densely populated, according to its extent, almost every house has a considerable outlet in the shape of a garden, yard, or otherwise; and from not being obliged to have the wells near cesspools, combined with the nature of the soil, the water is pure and uncontaminated; that every house and cottage I believe to have the use of a water-closet or detached privy with a vault; that a considerable portion empty at once into the river; that the vaults of the privies, in general, are kept well cleansed, and I can speak from my own experience that when any soil worth notice is accumulated, I have been solicited to allow it to be removed gratuitously, for the purpose of manuring the land; that as far as my own observations have extended, the cesspools are frequently emptied and cleansed, at a very trifling expense, the soil being appropriated to manure, as there is plenty of adjacent land to which it can be immediately conveyed.

“*State of the Burial-grounds.*—The churchyard of the parish of Buckland (being the principal burial-ground) is situated clear from the dwelling-houses. It is not crowded, but, if necessary, can be increased to any reasonable extent.

“*Number and Sanitary Condition of the Inhabitants.*—The number of the inhabitants at the last census, 1841, was 1,199. I should say that no village in the kingdom can scarcely be considered more healthy; and it is a common resort for persons afflicted with disease, for the sake of its pure air and cleanliness. I myself, with a medical gentleman, on Saturday last went round the parish, particularly those parts inhabited by the poorest parishioners, inquiring frequently at the houses as to the state of health in the immediate vicinity, and heard only of one case of serious illness (a child with the small-pox), and one person lying dead, a woman who had died in her confinement.

“*Local Acts for Paving, &c.*—These, I believe, apply to the parishes of St. Mary and St. James only.

“*Natural Drainage Areas.*—This subject I have treated in the remarks relating to sewage, &c.

“*Existing Municipal, Parochial, and other Local Boundaries.*—The whole of the inhabited part of Buckland is in the borough of Dover, unless I except one house, whose situation in that respect is disputed.

“*Boundaries which may be most advantageously adopted for the purposes of the Act.*—I do not desire to give any opinion as to other parts of the borough, and beg only to observe that it is my own opinion, as well as that of by far the greater portion of the inhabitants of this parish, the application of the Act should at least stop short of this parish.

“ With respect to the last and general subject, as I am unaware of the particular points upon which information is desired, I have only to say that I am ready to answer any questions that may be asked me, to the best of my knowledge, as far as regards this parish.

“(Signed) JOHN BAKER.

“ *Buckland, December 6, 1848.*”

“ We, the undersigned inhabitants of Buckland, have considered the statement made by Mr. Baker in the preceding pages, and believe the same to be correct, as far as our respective knowledge extends.

“ J. B. NALIENT, *Vicar of Buckland.*

GEORGE JENNINGS.

BENJAMIN FULLER.

GEORGE HOLLOWAY, *Overseer.*

THOMAS PROBBINS.

ABRAHAM SMALL, *Surveyor.*

WILLIAM PEPPER.

JOHN PIERCE, *Churchwarden.*”

With respect to this report it will be observed, that cesspools are used, and that pumps and wells are situated in the same neighbourhood ; cesspools are shown in this report to be the most expensive mode of draining a house, if such means can be termed “ draining” where the refuse is deposited in the same soil from which the water is drawn. That such water must be vitiated is an inevitable consequence, all experience proves this fact. Such drainage as exists passes into the river, which river passes through part of Dover, the “ Pent,” and the harbour, and any pollution from this source must affect all on the banks of the stream below this parish. I have thought it only fair to allow these gentlemen to speak for themselves ; but I believe they are entirely mistaken in their views and wishes, and I am quite sure that the greatest injury which could be inflicted upon the parish would be to shut it out from the general benefit conferred by the Public Health Act.

BRIEF NOTES of a PERSONAL INSPECTION in company with
Dr. SOULBY and E. KNOCKER, Esq.

Worthington's-lane and neighbourhood. There is no form of sewer here ; the houses and privies stand on a very limited area ; the surface gutters are foul, and the smell of the privies very offensive ; they must be much more so in summer. The cesspools are emptied by pumping the contents out upon the street surface in the night. This practice was very much complained of by the inhabitants. *Queen's-gardens.*—There is a house-floor below the level of the street ; no drain ; the floor very damp. There is a small back-room in which a “ tub” is placed ; a small window scarcely serves to light this foul and miserable room, and as it opens into a confined yard in which pigs are kept, and where filth has accumulated several feet in height

above the floor, fresh air never enters. The tenants said justly, "their place was not fit for us to come into." Near the new burial ground, there are cottages below the level of the ground, without drains, and they are in consequence in a filthy condition. There is a general depôt for the night-soil and tub refuse near here, the liquid drainage from which runs over the surface, and the dirt, stench, and nuisance was much complained of by the tenants of the cottages. *Adrian-street*.—There is a surface boulder channel only here, over which the drainage of all the adjoining sinks must flow. *Grubbin's-lane*.—There is a gully-grating in this lane, the receptacle of all the refuse from the houses in the neighbourhood; opposite this grating Dr. Soulby stated he had attended three cases of remittent fever, and Dr. Astley remarked that he had lost a case of fever in the same lane. Examined the kitchen under Mr. M'Cloud's house; one of the flooring-boards was removed to show the condition underneath. The soil was black and fœtid to a degree; most offensive to sight and more so to smell. In summer I was told the place was scarcely bearable, and it was stated that the female servants frequently left through sickness, or voluntarily gave up their place on account of the nuisance. The existing drain is about three feet above the level of the floor.

The sewerage from the barracks on the Heights near the Castle is brought down by a drain, and is carried out into the sea to low water by a pipe. The sewer sometimes bursts and creates a great nuisance to the inhabitants of the adjoining terrace-houses. The sewerage from the Western Height Barracks passes under a portion of the town, Snargate-street, &c. and is emptied into the "Pent." Mr. Rigden stated that this sewer at times burst through the pavement and flooded the streets, and that at all times the smell from it is a nuisance. Many of the female inhabitants complained bitterly that they could not keep their respective courts, yards, and houses clean, as they had neither drainage nor a water-supply. The tub nuisance was most loudly denounced, and especially the midnight removal, which is insisted upon by the authorities. "If they were removed in the mornings," said one female, "we could keep the doors and windows open to let out the nasty smell."

Richard Thomas Hunt, surgeon and medical officer, stated:—

"The parish of Charlton had been very unhealthy for months. Fever had raged within the last six months, which must be attributed in a great measure to defective sewerage. There had been also several cases of small-pox in the parish. Barwick's-alley is in a very bad sanitary state. I was detained by a case of sickness in one of these houses for two or three hours, when I was so affected by the stench that I became ill. Fever has also raged in that locality. Paper-alley is in a similar state. Peter-street, Colebrand-street, Branch-street and others are also in a very bad state."

Mr. Stephen M. Pain, relieving officer for Charlton, stated :—

“The drainage in that district is very bad ; in fact, there is none. There are 650 houses, or rather substitutes for houses—hovels. The whole parish is one receptacle for filth. In reference to Barwick’s-alley, where there are about 50 separate small huts, built in steps, one over the other, against a steep hill-side, there are but three privies attached, and there is only one very dirty draw-well to supply the whole neighbourhood with water. The horrid state of this alley is beyond description. The annual amount of relief in this parish was, for the last year, out-door 573*l.* ; aged and infirm, 216*l.* 10*s.* ; illness, 556*l.* 10*s.* ; total for one year, 1,146*l.* The number of deaths within the last twelve months was 68, out of a population of about 2000.”

I found the whole of these places, on inspection, in a most wretched condition ; Barwick’s-alley is a curiosity in its way. It consists of a most complicated contrivance of hovel over hovel, placed on rising ground ; the walls are made up of all sorts of rude and patchwork contrivances ; posts, apparently parts of old vessels, are boarded over with half-rotten boards ; there are also external walls half-brick thick ; flat timber roofs, covered with boards and brown paper, smeared with pitch, and broken stairs of wood, half worn out and ruinous, are approached by dark passages, not more than two feet four inches wide, and just at the end of one of which passages there is an open well, the water dirty and foul. This property is the contrivance of a man of the name of Barwick ; he lives upon the premises, and lets the places off to the most disreputable characters, male and female ; and looking to the returns and statement of the relieving officer, I have no doubt but that the parishioners would save money if they bought the property, if property it should be called, cleared it of its vicious and destitute tenantry, and took the whole place down, and then erected proper tenements on this or some other site, to be let at a reasonable rental, not in fact exceeding the present weekly sums obtained, namely, from 2*s.* to 3*s.* each. But the principal remedy in future ought to be preventive ; such property should not be allowed to rise into existence for the sole pecuniary profit of one man, as the amount of rent levied from such wretched places is at the direct money cost of the general ratepayers, as the parishes are burthened with pauperism and disease, generated (according to the medical testimony) in such localities. The health and safety of the inhabitants in the neighbourhood are endangered, and the morals of the people in the district are corrupted by this neglected class of inhabitants. From the cradle to the grave they oscillate betwixt such places and the gaol, and are, during the whole period of their lives, a direct money charge upon the parish or county funds.

STREET PAVEMENTS AND ROAD FORMATION.—No uniform and regular system of street pavement or road formation has

been adopted in Dover. The greatest portion is said to consist of boulder paving; squared sets have recently been laid down in some main streets, and there are two or three qualities of flint and stone used for macadamized streets and roads.

More experiments have probably been tried in street-making throughout this county than in any other branch of engineering, and a truly good street pavement is a problem yet to be solved; and if we examine all that is required, and what has been done, the reason of failure will be self-evident. A good street pavement should have the quality of a smooth and even surface, that wheeled vehicles may pass over it without jolting; it should be capable of resisting wear, to avoid the inconvenience and expense attendant upon frequent repairs; and it should offer sufficient footing to horses, that they may pass over it with perfect safety at the usual velocity. Freedom from dust and mud is only to be attained on any road or pavement by due and well-regulated cleansing.

Granite, limestone, or other stone pavement, chosen for its hardness, is found invariably to become slippery from wear, and consequently that which recommends it for durability is fatal to its safety; and to partially remedy this defect, one of the first essentials to a perfect pavement is set aside, namely, smoothness, and the stones are procured narrow, and are set apart, to give foot-hold to horses; and thus, to avoid one defect, three others are substituted. Each stone rests on a narrow base, and is, in a degree, isolated or separated by a wide joint, leaving it, in a measure, independent. The open joint admits wet and harbours dirt, and the space betwixt each stone causes the wheels to strike the pavement, instead of passing smoothly over it. This action is destructive alike to pavement and vehicles, as every wheel acts the part of a pavior's rammer; to this is added the constant jarring noise, so disagreeable to passengers and tradespeople. Wood pavement is not so noisy, but offers all the objections of insecurity in an aggravated degree. Pebble pavement has generally been banished from all streets over which there is much traffic, and its use ought to be entirely abolished, as the form of the stones is the worst possible for comfort and wear. The back streets and lanes in Dover have, however, this form of pavement at present, and *Mr. Gotto*, the late surveyor, speaks of it in the following terms:—

“Pebble pavement. is now to be found in the back streets and lanes, where its rugged surface forms ample receptacles for the filth of the worst neighbourhoods, while the surface drains in the middle of such streets and lanes are used to convey away, or rather from their nature to retain, the most offensive description of sewage, and I find it generally acknowledged by the residents in such localities that the stench is so palpable as sensibly to affect the health of the inhabitants. I have estimated, from actual measurement, that there are at least 15,000 superficial feet of such objectionable gutter pavements, which, according to accre-

dited formula, gives off a mass of highly injurious gas, equal to 900,000 cubic feet each minute. It is not, therefore, surprising that persons coming out of the comparatively pure sea atmosphere should so frequently complain of the perceptibly unwholesome state of the town."

Macadamized roads for towns have been tried on a large scale in Birmingham; in fact, all the streets in that town and the roads surrounding it are of this description of material, and with constant care and attention they are found to possess many advantages; when in perfect order they offer a comparatively smooth and even surface for the wheels of carriages, and when well watered and cleansed, they also afford a secure footing to horses; the carriage passenger experiences less of jarring, and the shopkeeper and pedestrian less of noise. To produce and maintain a good street surface of broken stone, several things are necessary: the material should be hard, to resist wear; it should be broken to an uniform size, that the wear may be equal, and means should be taken to form it into an even surface before the stones are separately rounded by the traffic; and the street or road should have a well-drained and solid foundation on which to place the broken material. When such a road has been formed, it requires constant attention and care to preserve it in perfect order; it must be regularly watered and swept in dry weather, and well cleansed by sweeping in wet weather; and to do this the most effectively and cheaply, the surveyor of Birmingham states that Mr. Whitworth's machines are necessary. He states:—

"Sweeping is the only mode of cleansing that should be allowed, either on streets or turnpike roads; sweeping by the wide brooms of Mr. Whitworth's machine is preferable to all other modes of cleansing yet tried. It must be evident that the fact of these wide brooms, sweeping longitudinally with a pressure that can be adjusted according to circumstances, tends powerfully to preserve the road and to consolidate its surface."

It ought never to be lost sight of, that neglected, imperfect, and bad roads and streets are the most expensive. They are disagreeably dusty in dry weather, and they are destructive alike of health and comfort in wet weather; a rough and uneven road rapidly destroys the wheeled vehicles which pass over it, and their violent action when in motion, tends, in an aggravated degree, to the further destruction of the road; ruts and holes retain the wet; this softens a place already weak, and accumulates mud; and on such roads horse power is wasted, at times, to the extent of one-half, or 50 per cent. "It is a common error to consider that road or street the cheapest which costs the least in direct expenditure;" and it is just as common an error to consider that road or street the best which has cost the most in its first formation. Perfect cleansing and constant attention and care are requisite on the

most expensive pavement; and with this a macadamized street or road offers many and singular advantages.

A well-formed and well-kept street or road should be nearly flat, on cross section, and if regularly swept, side-channels are not needed other than that which a very slight fall will give against the side-kerb. A flat road enables vehicles to pass with equal facility over its whole surface, thereby giving an equal wear; a section much rounded is most used at the crown of the road, and thus becomes unduly worn at that part.

The side channels may be formed with well-squared stone pitching, set in a line with the cross section of the street, and having a graduated fall to the gulley-grate; by keeping the channels flat the machine will sweep them perfectly, and dirt or wet ought not to be allowed to accumulate in them under any circumstances.

Foot-walks within the town may be formed of tiles, small and well-squared sets, or flags; these will form a dry foot-walk, and allow of easy repairs. Kerbs may be of granite, limestone, or such other hard stone fit for the purpose as the district may produce; they may be from four to six inches in thickness, and from nine to twelve inches deep. A granite kerb, twelve inches square, will cost per lineal foot three times the price of one equally as efficient; a hewn granite or sawn slate channel slab is an extravagant expenditure which ought to be avoided, as the amount saved by using cheaper materials may be better laid out in the neglected back streets.

The street crossings may be formed most cheaply of small sets, well squared and set close, and will not cost more than half the price of granite ashlar.

A dry foundation is the first requisite for a good road; and to be preserved dry, it must be well drained. If macadam be used, the streets should be well watered and machine swept. It will be found that the refuse from the sweeping-machine is of three kinds after it has been shaken in the body of the machine by removal. The coarse grit falls to the bottom, the finer particles and mud rise towards the surface, and the dirty water will swim on the top. This, with the mud, can be run off in the yard, and the bottom grit should be reserved to mix with the broken stone when a new road is laid down, or when a new coating is required for repairs upon any road or street. This grit is composed of small angular fragments of the same material as the broken stone from which it has been fractured, and if added to the stone when newly laid down, it forms a bed, or matrice, in which the angular blocks rapidly bed themselves before the carriage and cart-wheels can grind them round. A newly-formed or newly-repaired road should be well watered and attended to for a few days; the wheel ruts should be immediately levelled in, all loose stones thrust down or removed

at once, and instead of a newly macadamized road remaining a nuisance to the inhabitants, dangerous to equestrians, and a killing drag to cart and carriage-horses for weeks, the surface will set smooth and firm in a few days: and such a road or street, well attended to afterwards, will wear from one to three years. The whole of these rules have been verified in the practice of Mr. Pigott Smith, of Birmingham.

GRAVE-YARDS.—There are three principal grave-yards in Dover attached to churches; there are also other grave-yards attached to chapels of various denominations. There is also a cemetery belonging to St. Mary's Church, formed in 1835, on a piece of ground on the slope of the hill, under the redoubt on the heights. There are vaults under the Unitarian General Baptists' chapel, as also under some others. The burial-ground at the Friends' chapel is said to be kept very neat. A plan of the ground is kept and a register, so that it is known where every corpse is interred; no headstone or tombs are admitted over their graves, the whole surface of the ground being smoothed over and kept quite level. Like most other grave-yards attached to old churches, those in Dover are more than full, as the site, in many instances, has been raised by repeated interments above its original level. There are vaults in the yards, and also within the churches; some of these vaults are formed on the sides of the churchyards, where the roads bounding them are considerably below the level of the yard. There is a public thoroughfare to Dieu Stone, not more than four feet wide, forming a passage betwixt the burial-ground and a row of houses; the side of the burial-ground has been formed into vaults, which are merely closed towards the road by a flag on edge, and this has been perforated with ornamental openings, cut out in pattern, to act as ventilators. Out of these openings gas is observed to stream at times, and the smell is said to be highly offensive. One gentleman, Alderman Poulter, stated that he had frequently seen children peeping through into the vaults, and occasionally applying their noses to the openings cut in the flag-stones.

Francis Nash Pen, sexton and grave-digger of St. Mary's parish, stated:—

“There are three burial grounds of which I have charge,—St. Mary's, St. Martin's, and the New Cemetery. St. Mary's graveyard is quite full and not fit to be opened again. I have suffered inconvenience from opening graves in this churchyard; but interments do take place here at present. St. Martin's ground is more than full, and yet I buried three children here last Sunday. When I open out the old ground I cannot tell what I have in the way until I meet with the obstructions, and I frequently have to remove old interments to make room for the new. Both St. Mary's and St. Martin's burial-grounds are surrounded with houses. I have felt very serious ill effects during the time I have been digging graves in these churchyards, and I have given notice to the

churchwardens that I must decline to open any more ground here. The last three graves I made were in such a condition that I hope I never may be required to see such a state of things again. The new burial-ground is in good condition; it is on the chalk, and in ten years bodies buried here are thoroughly decomposed. This is the case in all graves dug in the chalk."

Thomas Woodroffe, assistant grave-digger in St. Martin's, confirmed the whole of this evidence.

Intramural interment is now acknowledged to be a monster evil, and this feeling is very generally entertained in Dover by clergymen, churchwardens, grave-diggers, and many of the inhabitants; yet such was the state of the law that no local authority possessed the necessary power to prevent certain contaminated portions of ground being opened, if parishioners, having what are termed family graves, demanded burial for their dead relations. The subject of "fees" is also found to induce pernicious interments.

The following evidence of *James Austin Caspall*, churchwarden of St. Mary's, will be found to bear on these portions of the subject. He stated—

"We do not wish to bury any more in St. Mary's or St. Martin's. I have endeavoured to stop all burials in both grounds for the last four years, but have not been able to do so. One reason why persons wish to be buried here is to avoid the extra fees they must pay in the new ground."

The same witness stated, "there are four other burial-grounds in the town attached to Dissenting chapels; all are surrounded by houses." It is an usual practice to perforate all the vaults to allow of what is called ventilation. Within the Baptists' chapel in Adrian-street there are vaults covered only by the boards of the floor. The next witness examined gave his evidence with comparative reluctance; apparently there was a fear that to close the grave-yard in which he worked would in some way be a pecuniary injury to himself.

John Carswell, sexton of St. James's parish, stated—

"The burial-ground is attached to the church. There are dwelling-houses bounding three sides of the graveyard. The ground is old, but it is not full. I have, however, no wish to receive any more (other than those who have ground here) at present. Burials take place in vaults within the church. There was a Committee appointed some time ago to provide another ground, and I have constantly asked for additional ground in which to bury strangers. I live near the churchyard, and get more stench and nuisance from the dwelling-houses near than I do from the graveyard."

In this graveyard there are vaults formed in the face of the cliff, and above the general surface of the ground, all of which have the perforations for ventilation before spoken of. Up to this time there has not been any other burial-ground provided for this parish, and great annoyance and inconvenience is suffered

by the parishioners in consequence. In Woolcomber-street a small burial-ground formerly existed, which belonged to the Society of Friends. This ground is now used as a coal-yard.

The following report will explain the condition of some of the burial-grounds, and the memorial will also show the wishes and feelings of many influential persons in Dover on this most important subject:—

“Report on Churchyard, Parish of St. James the Apostle, Dover.

“WILLIAM MINTER BUSHELL, parish clerk, your informant, has resided in the parish for upwards of forty years, and succeeded his grandfather in the office in the year 1826, having officiated for some years previous. The churchyard of St. James, on the north, south, and west sides, is surrounded with dwelling-houses; those on the north and south sides having been recently erected. On the east side is a steep bank, adjoining a Government battery, which has not more than two feet of earth on a hard chalk rock. This bank, which was originally covered with trees and shrubs, has, within the last few years, been all excavated for the purpose of brick vaults and brick graves, excepting a small piece at the south end, which cannot be applied for general burial purposes. There are three tier of vaults in the bank afore-named; many of them have air bricks, and apertures in them for ventilation, which I consider highly injurious to the health of the residents adjoining, and to children, who are generally, when allowed in the churchyard, peeping into and smelling at them. Full half the burial-ground is occupied by brick vaults and brick graves; the other half part is not all applicable to general burial purposes, there being a custom to keep graves for twenty years and upwards, where the deceased's friends are able to pay to the sexton 1s. or 2s. a-year. This causes the graves of paupers, soldiers, their wives and children, to be greatly crowded, and, in many cases, their graves are opened for the reception of a body, which is placed one on the other, in three weeks or a month after the burial of the first. In these cases, the smell arising has been very great; so that your informant and the minister officiating have often complained of it, and the sexton has often complained of the difficulty he has had in opening them, arising from the nauseous smell. There are many corpses not more than three feet under the ground. I know of no part of the churchyard, excepting the small piece in the bank afore-named, that can be opened without disturbing the remains of the dead in a very improper manner. The churchyard is also much crowded with tombs, head-stones, rails, &c., and is altogether inapplicable for the purpose of a burial-place for the parishioners of the parish, and has been so considered for upwards of twenty years; the old sexton having at that time often told me he knew not where to dig a fresh grave. The inhabitants of the parish in the year 1831 consisted of 1,674 persons, and 272 inhabited houses. In the year 1841, of 3,056 persons, and 521 houses, and the extra-parochial district adjoining, 205 inhabitants, and 37 houses. The extra-parochial district having no burial-ground of its own are, with the parishioners of the parish, compelled to seek a burial-place in the new burial-ground of St. Mary, Dover, which is very fast filling up, and subjects the parties to the payment of double fees. Burial is allowed in the church in brick

vaults and brick graves, but is very seldom applied for; and when such is the case, proof is required that the corpse is in lead, and the vaults and brick graves are properly secured.

"The rector and the parishioners are desirous of obtaining a new burial-ground.

"(Signed) WILLIAM M. BUSHELL, *Parish Clerk.*

"ST. JAMES CHURCHYARD, DOVER.

"SIR, 9, *St. James-street, Dover, 15th December, 1848.*

"IN addition to the information I sent a few days ago, which I withheld when you were at Dover (not at that time having the rector's consent), I give the following, relating to the crowded state of the churchyard.

(Copy.)

"NOTICE.

"*Parish of St. James the Apostle, Dover.*

"A GENERAL vestry will be held on Thursday, the 30th day of July instant, at three o'clock in the afternoon, for the purpose of taking into consideration the subjoined copy of a request that has been transmitted to us, the undersigned churchwardens.

"ROBERT FORSTER, } *Churchwardens.*
"W. S. COLYER, }

"25 July, 1846.

"TO the CHURCHWARDENS of ST. JAMES, DOVER.

"WE, the undersigned parishioners of St. James the Apostle, beg to call your attention to the necessity of providing, with as little delay as possible, a new burial-ground for this parish; the crowded state of the churchyard precludes the possibility of fresh interments without destroying the remains of persons recently buried, a proceeding as injurious to public health as distressing to private feeling.

"THOMAS MORRIS, *Rector.*

G. SOULBY, *M.D.*

H. L. ROSE, *Esq.*

COL. H. SMART.

MR. GEORGE SPAIN,

MR. JOHN HALL, *Builder.*

MR. LAMBERT WESTON.

S. HUTCHINSON, *M.D.*

C. B. WILKINS, *Esq., J.P.*

MR. J. W. NOWERS.

Rev. F. W. DARWALL, *Curate.*

W. SANKEY.

W. GRANT ROSE, *Esq.*

THOMAS COLEMAN.

S. STOLTERFOTH, *M.D.*

M. KENNETT, *Esq., Vestry Clerk.*

EDWARD F. ASTLEY, *M.D.*

B. E. WINTHROP, *Esq.*

JOHN JEKEN, *Esq., J.P.*

G. T. THOMPSON, *Coroner.*

MR. W. WRIGHTSON.

"A meeting was held, a Committee immediately appointed, but they decided to wait for the introduction of the Health of Towns' Bill.

"(Signed) WILLIAM M. BUSHELL."

That a cemetery or cemeteries are required in Dover the whole of the evidence given most amply sets forth, and a few suggestive remarks may prove useful. Where practicable, a cemetery should be placed to the north or east of a

town, that the prevailing winds from the west and south may carry any effluvia which may arise away from the houses. A cemetery should, where practicable, be so situated that the ground, if not naturally dry, may be cheaply drained. Such drainage should be so arranged that the outlet would not create any nuisance. Provision should be made to prevent encroachment on the cemetery boundary by dwelling-houses. The angle of two roads may be chosen as affording easy means of access, and also as preserving two sides at least from crowding. The permanent wall-fence on the other sides may with advantage be set in from the extreme boundary, so as to leave an outer margin of land, not less in width than 30 feet; and this land may be fenced in with railings, or otherwise; and be profitably used as a shubbery or plantation. If brick vaults are constructed, they should be provided with means of free ventilation, so as not to be locally injurious; tile-pipes may be carried from each vault into one common shaft, where means can be adopted to neutralize the gases and render them innocuous. If the ventilation of every grave could be insured and controlled much benefit would be derived from the plan; as, where gas is generated, it must pass off into the atmosphere; either slowly through the soil, or rapidly when graves are reopened. Pipe-tiles may be so arranged as to ventilate every grave, and chemical means may be adopted to prevent any dangerous nuisance from them. A plan of the ground should be well laid out, and the interments should take place in a regulated order. A perfect registry of all burials should be kept; the plan and books having reference to each other. Interments should be so regulated that no exposure of former burials should ever take place. The whole of the ground should be preserved clean in appearance; a quiet, rather than an ostentatious appearance should be maintained.

of the FORM of the REGISTER BOOK of INTERMENTS kept at the BIRMINGHAM GENERAL CEMETERY.

Running No.	Section No. of Grave.	Depth. Feet.	Name of Deceased.	Parents' Name, Relative, or principal Connexion.	Last Residence.	Age.	Disorder.	Officiating Minister.
6512	481 } 482 } Q	18	Edward Timms.	Thomas Timms.	New Summer-street, Manchester-place, 11 Ct. 3 Ho.	17	Phthisis.	Bernard Ivers.
6513	55 D	16	Charles George Foster.	Elizabeth Blaney.	Spring-street.	W. D. 1 5	Erysipelas.	Peter Sibree.
6514	12 E	8	Richard Whittall.	Thomas Haywood.	3, Old Meeting House-yard, Deritend.	M. 7	Marasmus.	Peter Sibree.
6515	957 K Re-opened.	12	Francis Owen, Clerk.	Francis Clark.	Hazelwood House, Edgbaston.	20	Phthisis.	Samuel Bache.

SLAUGHTER-HOUSES.—There is no proper provision for slaughtering cattle and sheep in the town, but each butcher chooses such place as he may think fit. Frequently these slaughter-houses are in a crowded neighbourhood; as, one in Bench-street, near Mr. Metcalf's house; the refuse is thrown out on to a neighbouring midden, or piled in a heap in the confined yard. For want of proper drains, the blood and garbage accumulates, until in summer the whole neighbourhood is affected with the nuisance.

PIG-STIES.—There are no regulations as to pigs being kept, and, consequently, they are to be found in various parts of the town, in most objectionable places; close crowded upon human habitations, damp, confined, dirty, and creating a most disgusting nuisance. In Chapel-place there is a row of cottages which have narrow yards sloping up from the living rooms, and at the upper end of these yards pigs are kept, the wet and filth from which soaks down and is washed over the surface into the houses. To preserve the health of the people, these pigs should be at once and for ever removed.

PUBLIC LODGING-HOUSES.—These should be placed under inspection and control; each room should have proper means of ventilation, and the number of beds limited; a separation of the sexes should be insisted on, and every public lodging-house should be open only under the powers of a licence granted by the local Board of Health, and certified by the medical inspector. At present, these places are the common resort of tramps, pedlars, and pickpockets, and the rent charged is excessive, amounting to no less a sum than 20*l.* or 30*l.* a-year for one room, where many beds are crowded together, the price for each bed being 6*d.* a-night. The parties who keep these places are frequently of the lowest character, and their houses are now put to most improper uses.

PUBLIC-WALKS AND RECREATION-GROUNDS.—There are no public parks or recreation grounds, but there are many beautiful walks in and near Dover free to the public. The whole range of sea-frontage, from the harbour eastward, called the Esplanade, Waterloo-crescent, and East Cliff, is one public walk; open alike to resident and visitor. There are also public walks on the several heights above the town, but these are under the control of the Board of Ordnance.

GAS-WORKS.—The gas-works are situated under the East or Castle Cliff. The company obtained their Act, 3rd George IV., for lighting the town and port of Dover, in 1822. The gas is made from the best Newcastle coal; the works consist of 25 retorts, 7 feet 6 inches long and 15 inches diameter, with gas-holders capable of supplying the whole town. The general charge is 7*s.* 6*d.* per 1,000 feet. Mr. Evans stated, that the public lamps are lighted by contract at 3*l.* 3*s.* per annum for

at swing burners; 35s. for three jet burners. A new contract was entered into about three years since for 21 years.

The price charged for gas is very various throughout the towns in England. There is no recognized rule or standard price, but each Company obtains, apparently, that which the Directors consider the best price; and unfortunately for themselves and for the public, they in general consider a high charge the best; this however is not always the case, the Company at Whitehaven clear 10 per cent. on 4s. per 1,000 feet. The Company at Taunton are in difficulties, with a charge of 7s. per 1,000 feet.

Comparative cost of Gas in several Towns.

	s.	d.
Dover, gas is charged per 1,000 feet . . .	7	6
Watford, gas is charged per 1,000 feet . . .	8	0
Birmingham, gas is charged at prices varying from	6s. 8d.	to 3 9
Wolverhampton, gas is charged at prices varying from	5s.	to 4 6
Whitehaven, gas is charged per 1,000 feet . . .	4	0

In Wolverhampton the price of gas was, on the establishment of the works, 15s. per 1,000 feet; subsequently reduced to 2s. 6d., 10s., 8s. 4d., 6s. 8d., and now 5s., and to large consumers 4s. 6d.

In Whitehaven the price of gas in 1830 was 12s. 6d. each 1,000 feet; subsequently reduced to 10s. 8d., 8s., and now 4s.; and the Chairman informed me that at this latter price they expected to divide ten per cent.

Public lamps are paid for at the following rates in the several towns named:—

	£.	s.	d.	
Dover	3	3	0	per annum.
Birmingham	3	10	0	„
Wolverhampton	2	16	4½	„
Whitehaven Town	3	0	0	„
Whitehaven Harbour	4	2	0	„
Rugby	2	10	0	„
Coventry	3	0	0	„
Watford	4	0	0	for eight months each year only.

It will be seen by glancing over these tables that the price of gas varies from 8s. to 3s. 9d. each 1,000 feet; and that public lamps are charged per annum from 3l. 10s. to 2l. 10s., and singularly enough the maximum price is in Birmingham, where there is a sliding scale, to favour large consumers; and the minimum price is in Rugby, where the consumption is necessarily much less than in Birmingham. The reverse of this would

have been anticipated, if the Birmingham scale is founded in equity, and had been accepted as data to reason from.

That a town should be well lighted is of the first importance, whether considered in a social or moral point of view; but even as a matter of police it is cheaper to pay for the necessary lights rather than leave the worst districts in darkness. Not only should the main streets and squares be regularly lighted but also the back streets, courts, and alleys. A lamp tends to the comfort and safety of the inhabitants, and also prevents much mischief and immorality. If three lights can be placed and maintained for the price now charged for two, and equal benefit be derived by the Gas Companies, in a generally increased consumption throughout the town, all parties will be alike benefited. A price which is profitable in Whitehaven and Rugby will, with wise management, be found advantageous in other towns. Extravagant charges defeat their own purpose as they diminish consumption, beget discontent, and sooner or later produce rivalry.

TABLE of the Annual House Rental of the Borough of Dover.

Nos.		Annual Rental of each.			Total Rentals.	
		£.	s.	d.	£.	s. d.
1	House at Annual Rental of	650	0	0	650	0
1	Ditto ditto each	320	0	0	320	0
1	Ditto ditto „	220	0	0	220	0
1	Ditto ditto „	210	0	0	210	0
1	Ditto ditto „	200	0	0	200	0
1	Ditto ditto „	190	0	0	190	0
5	Ditto ditto „	170	0	0	850	0
3	Ditto ditto „	160	0	0	480	0
5	Ditto ditto „	150	0	0	750	0
4	Ditto ditto „	140	0	0	560	0
14	Ditto ditto „	130	0	0	1,820	0
25	Ditto ditto „	120	0	0	3,000	0
7	Ditto ditto „	110	0	0	770	0
17	Ditto ditto „	100	0	0	1,700	0
26	Ditto ditto „	90	0	0	2,340	0
47	Ditto ditto „	80	0	0	3,760	0
30	Ditto ditto „	70	0	0	2,100	0
27	Ditto ditto „	60	0	0	1,620	0
43	Ditto ditto „	50	0	0	2,150	0
96	Ditto ditto „	40	0	0	3,840	0
224	Ditto ditto „	30	0	0	6,720	0
357	Ditto ditto „	20	0	0	7,140	0
438	Ditto ditto „	15	0	0	6,570	0
426	Ditto ditto „	10	0	0	4,260	0
1,489	Ditto ditto „	5	0	0	7,445	0
282	Under £5, say each	2	10	0	705	0
3,571	Carried forward . . . . .	..			58,370	0

TABLE of the Annual Rental of Property, such as Lands, Gardens, Brick-yards, Cow-houses, Stables, Farm Buildings, Mills, Store-houses, Brew-houses, Malt-houses, Glass-works, Boat-houses, Bathing Rooms, Vaults, Gas and Water Pipes, &c.

Nos.		Annual Rental of each.			Total Rentals.	
		£.	s.	d.	£.	s. d.
	Amount brought forward from House Rentals				58,370	0 0
1	At Annual Rental, each	220	0	0	220	0 0
2	Ditto	180	0	0	360	0 0
1	Ditto	160	0	0	160	0 0
1	Ditto	150	0	0	150	0 0
1	Ditto	130	0	0	130	0 0
1	Ditto	120	0	0	120	0 0
2	Ditto	110	0	0	220	0 0
1	Ditto	100	0	0	100	0 0
2	Ditto	90	0	0	180	0 0
5	Ditto	80	0	0	400	0 0
3	Ditto	70	0	0	210	0 0
9	Ditto	60	0	0	540	0 0
9	Ditto	50	0	0	450	0 0
19	Ditto	40	0	0	760	0 0
11	Ditto	30	0	0	330	0 0
27	Ditto	20	0	0	540	0 0
27	Ditto	15	0	0	405	0 0
41	Ditto	10	0	0	410	0 0
72	Ditto	5	0	0	360	0 0
46	Under £5, say each	2	10	0	115	0 0
	Dover Harbour, rated at	873	0	0	873	0 0
	Dover Railway Station	1,417	10	0	1,417	10 0
281	Total Rental				66,820	10 0

BATHS AND BATHING-MACHINES.—Dover is partially celebrated for the accommodation afforded for sea-bathing; there are also commodious hot, cold, and shower baths on the Parade. Reading-rooms are attached to each of these baths.

There are no public baths and washhouses for the working classes and poor of Dover, although such may be provided and managed at a rate of charge which shall be cheap to the cottager, and make the establishments self-supporting.

The experience of the great benefits derived from such establishments in Liverpool is shown by the last returns of the baths and washhouses for the quarter ending the 24th May, viz.:—

Paul-street.—1,183 cold, and 9,817 warm baths; receipts 143*l.* 16*s.* The children of various schools, with their teachers' inspectors of nuisances, &c., to the number altogether of 19,139, had gratuitously bathed; 20,512 dozen of clothes had been washed, yielding 56*l.*, and making the total receipts of the quarter 200*l.*

Frederick-street.—1,498 cold, 4,750 warm, and 108 vapour baths; the total number paid for being 6,346, and the receipts 85*l.*; bathed gratuitously, 6,361; dozens of clothes washed, 10,352, yielding 21*l.*, and making the total receipts 106*l.* How

much benefit has been derived by the 6,361 persons who have gratuitously bathed it is impossible to say, and, consequently, the money estimate of these establishments is no test of their true utility. But the principal improvement to be desired is, good water, cheap and abundant, that private baths and wash-houses may be supplied with facility.

WATER SUPPLY.—A full, abundant, and cheap supply of water is of the utmost importance to the inhabitants of any town or community. It should be abundant and cheap, that every householder may have the means of producing cleanliness; it should be pure, that health may be preserved; and, if possible, it ought to be soft, that it may be used in quantity with the least expenditure of soap and soda. It is a fact which has been most clearly and fully proved by works in actual operation, that a local supply of water is most economically managed by unity of action; that is, the works and means of supply should be under one management, whether that of a Company or otherwise. There will then be only one set of works and mains required, and one set of officers, instead of two, where rival Companies exist. But in all cases it is most desirable that the supply should be managed for the sole benefit of the community, and this can only be brought about by the existing works becoming (in the case of Dover) the property of the Corporation. This suggestion is not meant to impute blame to the proprietors of the present supply; they have done, in a limited degree, for a profit, that which the public authorities have hitherto declined or neglected to undertake; and in the event of the Corporation, as the local Board of Health, undertaking a full supply of water to Dover, the Public Health Act has defined how this may be accomplished in an equitable manner. There are several reasons why a water supply should be managed by the local Board—that a minimum outlay in works and management may be incurred, and that free fountains and cisterns may be placed in all proper places for the use of the public generally; that the mains may be used in the place of fire-engines; that all streets and neighbouring roads may be regularly and abundantly watered; that the drains and sewers may be regularly flushed and cleansed, and that the surface of all back streets, alleys, courts, passages, and channels, may be properly washed; and also that public and private baths may be supplied at the least possible cost. The general supply will also be at such a price only as shall pay the interest of the capital borrowed, the working and other expenses, as provided under the provisions of the Public Health Act.

A soft water cannot be obtained from the chalk formation, as all the water found in this rock is charged with hardening matter derived from contact with the strata. It must also be

observed that the surface of a chalk district is in general highly absorbent, so that there are few surface rivulets or streams, other than those having their origin in springs; and consequently, there is no rain-fall or surface-water available free from the objectionable hardness of the spring-water. Dr. Thomas Clark, professor of chemistry at Aberdeen, has patented a process whereby the hardening matter derived from chalk is precipitated by the use of a solution of quicklime, or burnt chalk. The cost of this material is estimated at 5s. for each 1,000,000 gallons of water, or a little more than $\frac{1}{2}d.$ for each 10,000 gallons. The process proposed will remove three-fourths of the whole hardening matter, and will effect a corresponding saving in the use of soap. As thus: where 100 gallons of the West Dover water, when unpurified, require for producing a lather $32\frac{1}{4}$ ounces of soap, when purified only $10\frac{1}{4}$ ounces will be required. But in the words of Dr. Clark, "Altogether apart from any saving in soap or soda that may arise to the inhabitants from the adoption of the patented process, there is the consideration of comfort in using soft water." "The use of peculiar and expensive soaps never can compensate for hardness in water." "The new process will also prevent fur in boiling, will separate vegetating and colouring matter, and also destroys water insects." If the patented process will only save 5s. a year to each householder in washing clothes, the annual saving in money to the whole community will be upwards of 800*l.* This will be independent of all the advantages to be derived from soft water for personal bathing and washing, for drinking, and for infusing tea, cooking, brewing, and other similar purposes. A pure and soft water for the full supply of the district would save directly and indirectly several thousand pounds sterling per annum.

NOTE on four specimens of WATER from DOVER. By THOMAS CLARK, Professor of Chemistry in the University of Aberdeen.

	Total Hardening Matter present.	Actual Hardness.	Latent Hardness.	Alcaline Hardness.	Neutral Hardness.	Curd Soap to form a lather with 100 gallons of the water.
East Dover Water Works . .	$11\cdot5$	$= 11\cdot5$	$+ 0\cdot0$	$= 9\cdot9$	$+ 1\cdot6$	$24\frac{1}{2}$ oz.
West Dover Water Works . .	$16\cdot3$	$= 15\cdot4$	$+ 0\cdot9$	$= 14\cdot9$	$+ 1\cdot4$	$32\frac{1}{4}$ oz.
Well near St. James' Church . .	..	$15\cdot5$	..	..	..	$32\frac{1}{2}$ oz.
Well, 168, Snargate Street . .	..	$16\cdot2$	..	..	..	34 oz.

Each degree of hardness stands for as much hardness as a grain of chalk per gallon would produce; each degree of alkalinity for as much alkalinity (that is as much power of neutralizing sulphuric or other acid) as a grain of chalk per gallon would possess.

The latent hardness is owing to magnesia, which sometimes does not act upon soap till the water is farther diluted with distilled water.

When the West Dover water is diluted with its own bulk of pure water,

the hardness is $\frac{16^{\circ}3}{2}$ not $\frac{15^{\circ}4}{2}$.

The East Dover water has a distinct vegetable taint, sensible to the taste.

The lime-water process of purification was tried on the first two waters, with the following results—

	Actual Hardness.	Curd Soap to form a lather with 100 gallons.
East Dover, Unpurified	11 ^o 5	oz. 24 $\frac{1}{2}$
,, Purified	4 ^o 0	9 $\frac{1}{2}$
Difference	7 ^o 5	15
West Dover, Unpurified	15 ^o 4	32 $\frac{1}{4}$
,, Purified	4 ^o 4	10 $\frac{1}{4}$
Difference	11 ^o 0	22

As the difference of hardness between the resulting purified waters, is trifling, I regard the West Dover water as preferable to the East Dover water, which, as has been stated, has a vegetable taint. At least such was the character of the specimen sent to me.

The three last specimens are of a hardness exceedingly common in chalk districts. In fact, 16^o is a sort of standard hardness in chalky districts.

The well-waters had not any notable characters of water contaminated with organic matter.

As to the probable cost and the probable saving of the purifying and softening process, the following may be taken as an approximate estimate.

Official returns prove that the consumption of soap for all Britain is 7 $\frac{1}{2}$ lbs. = 120 oz. per head per year. In a hard-water district, such as Dover, I assume the consumption to be double this, or 15 lb. = 240 oz. per head per year.

In the case of Dover, I assume the following numbers for data :—

20,000 population ; 400,000 gallons of water per day = 146,000,000 of gallons per year ; 2,300*l.* water-rent.

	£.
146,000,000 of gallons of water will require, of quick lime, 80 tons per year, at 10 <i>s.</i> (?) . . .	40
Interest on capital and expense of working, the same as for the process of filtration, 1 <i>d.</i> for 3,000 gallons	201
Patent royalty, 2 $\frac{1}{2}$ per cent. on 2,600 <i>l.</i> of gross water-rent	65
Cost of purifying and softening 146,000,000 of gallons	£306

= 20,000 of population at $3\frac{3}{4}d.$, nearly = the price of 10 oz. of soap, nearly = $\frac{1}{2}\frac{1}{4}$ of the consumption of soap per head. Hence, it would follow, that if the saving on the consumption of soap be only 10 oz. per head per year, the inhabitants would incur no loss on the whole by making use of the process. Now, 10 oz. of soap is destroyed in bringing up 45 gallons of the West Dover water to a lather over and above what would be destroyed if that water were purified and softened: 45 gallons of water per head per year is equal to *one pint of water per head per day*. The saving of soap on this quantity of water, supposed to be made use of in washing clothes, will pay the expense of the purifying and softening process. But I reckon, not one pint, but *one gallon per head per day*, to be a fair estimate of the water actually made use of in the washing of clothes = 365 gallons per head per year, on which the saving will be 80 oz. = 5 lbs. Say 2s. 6d. per head per year. Which, on 20,000 of population, is 2,500*l.* per year. That is to say, *the saving on soap alone*, according to this estimate, *is equal to the whole water-rent*.

I am aware that instead of lime, soda may be made use of, in order to soften the water. Such, indeed, is a general practice. But, on the other hand, there is an important difference between a water softened by the lime process and a water softened by soda. If you remove chalk from a water by lime, none of the lime that you add to the water remains in it; whereas if you remove chalk by soda, all the soda that you add to the water, remains in it, and acts on the clothes as carbonate of soda. Now, soda in water injures the colours of calico dresses and furniture, of blankets and other undyed woollens; so that in every case where the making use of soda is not a downright necessity on account of the hardness of the water, it will be a question whether the saving in soap will compensate for the damage that soda does to the colour and value of the clothes washed.

On all these considerations, it appears to me probable that not only will the inhabitants of Dover, by adopting the lime process, incur no loss, but reap a saving, if not of the whole, at least of some considerable fraction of the water-rent.

Lime water, saturated, contains per 1,000 gallons exactly 14 lb. of quick lime. Allowing for loss, say 16 lb., or 1 lb. per cubic foot.

East Dover water—

1,000 gallons of lime water = 16 lbs. lime.
17,500 gallons of the water.

18,500 gallons of mixture to 16 lbs. of lime.
1,156 gallons ,, 1 lb.

West Dover—

1,000 gallons of lime water = 16 lbs. lime.
11,750 gallons of water itself.

12,750 gallons of mixture to 16 lbs. of lime.
797 gallons ,, 1 lb.

October 1, 1849.

THOMAS CLARK.

The question of a full supply of water is one for careful con-
[71.]

sideration. The river is so completely occupied by mills, from its source to the harbour, as to hold out little hope that any economical arrangement can be made with the present claimants; and this water is nearly as hard as well-water, and would also require to be pumped for all the higher portions of the town; so that pumping from wells near the town will probably be the best and cheapest mode of supply. There is no doubt as to any required quantity being obtained, as the chalk of this district is known to be full of water. The cost of reservoirs and pumping will, from the character of the site, be at a minimum. The reservoirs may be constructed on one of the adjoining cliffs; the lift may be vertical, and the supply main will be short, and comparatively cheap in consequence.

Taking into consideration all the requirements of the town, and the probable demand from shipping, the works ought to be capable of supplying 2,000,000 of gallons each day. The actual working cost of raising this quantity 100 feet will be 25s. each day, or 375*l.* a year: this is exclusive of interest on capital sunk.

The cost of a full supply of water does not bear a strict ratio to the quantity, but is found to diminish in proportion to the extent of the works and power required. That is, one 50-horse engine will work more economically than two 25-horse engines, if placed distinct and apart, and 2,000,000 of gallons of water can be pumped at a less rate per gallon than half this quantity; so that unity of works and unity of action are desirable on this account.

When the individual cost of a private supply of water is contrasted with the paying charges made by some public Companies, the economy and advantage of the one over the other will be very apparent. To sink a well, erect a pump, and maintain the apparatus in working order, will cost as under, varying slightly, of course, with circumstances:—

	£.	s.	d.
Sinking well, say	7	0	0
Pump complete	3	0	0
First cost	£10	0	0
Interest on 10 <i>l.</i> at 5 <i>l.</i> per cent per annum	0	10	0
Cost of annual repairs to pump, say	0	5	0
Labour of pumping water, and wear and breakage of utensils, say	0	15	0
Per annum	£1	10	0

Thus 1*l.* 10s. sterling will be either directly or indirectly incurred for a water supply, if obtained from pumps; in many instances the annual cost is much more than the sum named, as

a deep well and pump will cost from 20*l.* to 50*l.* in some situations, and the annual expenses vary from the above-named cost to 5*l.* This mode of supply excludes every public advantage; but if entirely relied upon, creates many nuisances, as seen by the evidence on the demoralizing tendencies of a crowded public pump. The introduction of water by pipes into a house will sometimes nearly supersede a domestic servant, or at least add very much to the value of the services of the one or more servants that may be employed in the house.

From the actual working experience of several towns where the whole water supply is raised by steam-power, it has been ascertained that a full supply, at constant high-pressure, can be given to each cottage at prices varying from 1*d.* to 1½*d.* a week, or at an annual charge not exceeding 6*s.*—a cost five times less than the cheapest form of pump, as shown by the estimate. But apart from the cost, one of the most important advantages conferred by a well-regulated general supply is the superior quality and purity of the water. Few private wells sunk into a subsoil covered with dwelling-houses yield wholesome water; when analysed by the chemist, it is found to be contaminated either with the cesspools, drains, or graveyards; frequently it contains a compound of all these sources of impurity. The transparency of a water is no test of its purity, as many sparkling and transparent waters contain both solid and gaseous impurities, most disgusting and dangerous to health. The subsoil on which Dover is built is extremely porous and absorbent.

PROPOSED SEWERAGE AND DRAINAGE.—The house and soil drainage may be carried by tile-drain pipes into a tank or tanks, which may be constructed north of Johnson's Nursery. From the west a drain may be carried from Beach-street through Clarence-place, Cross Wall, Strond-street, Commercial Quay, Snargate-street, Bench-street, King-street, and Church-street, crossing the river to the north end of Johnson's Nursery-ground. The property betwixt Beach-street and Archeliff Fort may be drained along Limekiln-lane into Snargate-street, where it will join the main previously described. The drainage from the east may be behind East Cliff terrace, Marine-parade, to Hammond-place; and from the Esplanade and Waterloo-crescent to the same point. Hubert-terrace, Laureston-place, Alfred-place, and this district will pass into the same main line of drainage, and from the Canterbury-road to the Military-road. Adrian-street and all the intervening district will fall into the main, passing to the proposed tank or reservoir. The sections have been taken by Mr. Gotto, and he reports that the line of main, as proposed, is practicable. Before, however, any actual work is commenced, a correct survey will have to be obtained, upon which the proposed main sewers and branches

would be arranged according to correct levels, sections, and trial borings.

ESTIMATES.—A detailed Estimate for the Water-works and sewage cannot be made without the detailed data to calculate from, and the value of the present works ought to be ascertained; and should, if they are purchased, be added to the estimates. I consider these estimates fully adequate for the work proposed:—

Water Supply.

Proposed expenditure £10,000 0 0

Income—

House supply 2,063 0 0

Shipping and large consumers 300 0 0

£2,363 0 0

Working Expenses—

Working expenses, management,
and depreciation £1,100 0 0

SEWERAGE.

Mains complete 3,440 0 0

Sub-mains and branches complete 1,200 0 0

Gully grates and traps 400 0 0

Manure tanks and pumps 1,000 0 0

6,040 0 0

Survey and contingencies 460 0 0

£6,500 0 0

ABSTRACT OF EXPENDITURE AND INCOME.

<i>Expenditure.</i>			<i>Income.</i>		
	£.	s.		£.	s.
Water-Works	10,000	0	Water-Works	2,363	0
Sewage	6,500	0	Deduct Working Expenses	1,100	0
Total	£16,500	0	Nett Income	1,263	0

Annual Average Instalment, at $7\frac{1}{2}$ per cent., calculated to maintain the works, and pay off in 30 years principal and interest . } 1,237 10

Balance in excess £25 10

If the present Water-works are purchased, their value will have to be ascertained, by arbitration or otherwise. The income estimated would, I have no doubt, be increased, and it will be seen there is no credit taken for sewage refuse. But

any income from this source would be applied in reduction of general rates, as also any surplus from water-rates. The Corporation of Manchester receive a clear income of upwards of 35,000*l.* a-year from their gas-works alone, and this is expended on town improvements and in reduction of rates. The establishment of these works was violently opposed in the first instance.

The cost of private and house-drains will not exceed 6,600*l.*, which must be levied as a private improvement rate, and would be about 3*d.* in the pound on the whole rateable property. But the owner of a 10*l.* house could either pay down at once the first cost for private drains, which will not exceed 1*l.* for a cottage, or he may pay a rate or rent-charge of 1*s.* 6*d.* a-year.

HOUSE-DRAINS AND WATER-CLOSETS.—As in a complete system of water supply every house should have a water-tap provided, so each house and yard should have a drain to take off the refuse. A branch to the sink may be provided, with a bent syphon or water-trap: into this branch, in many instances, the water from the roof will pass direct, and there should be a separate branch for the surface drainage and water-closet. Detailed estimates have been made out for such apparatus in other places, and the works executed for a cost to each house; not exceeding an annual charge of 3*s.* 9*d.*, or less than 1*d.* a-week.

Effective tile-drains may be laid down at a cost much below the usual charge; drain-tiles, 12 inches by 9 inches, have been laid complete, for 3*s.* 6*d.* each lineal yard; and house-drains, 6 inches and 4 inches diameter, have been laid down complete, including traps, at an average of 1*s.* 6*d.* each lineal yard. These prices include tiles, excavation, laying, and making the ground good.

The following extract is from a letter on the drainage of Back King-street, Bury, by *William Harper, Esq.*, solicitor, and one of the Bury Improvement Commissioners:—

“I am happy to say that the plan of draining Back King-street, as laid out by you, has fully answered our expectations. It has been carefully executed by our workmen, under the superintendence of our surveyor, Mr. Johnson. The work has been done for a less sum than your original estimate.

“The main drain is 12 inches by 9 inches, egg-shaped, and is laid at an average depth of 9 feet: this cost complete, about 3*s.* 6*d.* each lineal yard. The cost of gulleys and traps is about 1*l.* sterling each. The cost of yard and house-drains (some of which are 6 inches diameter, and others 4 inches diameter) was 1*s.* 6*d.* each lineal yard, laid complete. The average cost to each house for the yard, house, and branch-drains was about 10*s.*; but some of the cottages did not cost more than 5*s.* 1*d.* each.

“Back King-street was by far the filthiest in the town, and the rate of mortality exceeded the general average. Dr. Lyon Playfair states,

at page 87 of his report,—‘ According to the evidence of Mr. Fletcher, its unventilated courts, unsewered street, and filthy surface rendered it exceedingly unhealthy, as shown by the astonishing proportion (62 per cent.) of infantine mortality, and the low average of life, amounting to 14 years only, and also in the frequency and severity of epidemics among its population.’

“ This street is now thoroughly drained and paved ; every house is drained, and syphon traps have been placed on all the sink-pipe drains. The down-spouts from the roofs are carried directly into the drains below the syphon trap, and thus the rain-water from the roof flushes the drain, and the down-spout ventilates it. Mr. Johnson, the surveyor, states that, ‘ since the completion of these works, the houses let much better than formerly ; and several parties who had given notice to quit, in consequence of the bad sanitary condition of the street, have renewed their tenancies.’ The Superintendent Registrar states that, ‘ the health of the district has been materially improved ; and that, though several cases of cholera have taken place in Bury, not one has occurred in Back King-street ; in its former state this would, most probably, have been the first place where such disease would have shown itself.’

(Signed) “ WILLIAM HARPER.”

MANAGEMENT OF WORKS.—To insure unity of action and economy, the whole of the sanitary works should be under one management, so that one set of offices and officers will perform the entire work. The servants of one establishment will serve for all purposes connected with the local management of the works during their progress, and their maintenance afterwards.

The principal portion of Dover may be drained with earthenware tile drains, and these may be most advantageously made by contract. But in order to insure the utmost efficiency and economy in the works, and to afford every facility and guarantee for their execution, steps should be taken to provide the best means for the manufacture of the materials, and to organize a body of men to construct the work ; and this will be best attained by contracts, which shall embrace the maintenance of the works in perfect repair after their execution.

The work executed at Bury would have cost more than three times the amount at the usual prices.

APPLICATION OF SEWER AND DRAIN REFUSE TO AGRICULTURAL PURPOSES.—That sewer refuse, properly reserved, is highly valuable as a manure is a fact fully demonstrated by such chemists as Leibig and Playfair, and by such practical farmers as Mr. Smith of Deanston ; such refuse will be peculiarly valuable to the chalky soils around Dover ; and its use will confer a benefit on the land-owner, on the farmer, and on the inhabitants of the town. *Mr. Parks* stated at the inquiry, “ that as some doubt had been expressed whether the farmers in the neighbourhood would take the manure which would be drained into large reservoirs, he had ascertained that the farmers now regularly sent in waggons, with a team of horses and

two men each, from distances of four and five miles; and that they paid eight shillings for each waggon load of this manure in the town. The men and horses were compelled at present to do this work in the night-time, but if they could obtain it in the day-time, and at a moderate charge, he had no doubt but that they would be glad to buy any quantity which could be produced."

BOUNDARIES FOR THE PURPOSES OF THE ACT.—I would beg respectfully to recommend that the municipal boundary, including the extra-parochial district of the Castle, shall be the boundary for the purposes of the Public Health Act. The proposed boundary is shown upon the plan attached to this Report.

CONSTITUTION OF LOCAL BOARD.—The town of Dover being a corporate borough, the local Board will be formed as the Act directs.

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS.—I beg respectfully to lay the following summary before the General Board of Health for their consideration:—

That the borough of Dover is not so healthy as it may be, on account of an insufficient water supply, ill-paved streets, want of privy accommodation, badly constructed, confined, and undrained streets, courts, and houses, open middens and cess-pools, the tub nuisance, stagnant ditches, a contaminated harbour, and overcrowded burial-grounds; and that excess of disease has been distinctly traced to these defects.

I HAVE THEREFORE TO RECOMMEND—

That the Public Health Act may be applied to the town; as the health of the inhabitants would be improved, their comforts increased, their moral condition raised, and the rates reduced—

1. By a perfect system of street, court, yard, and house-drainage.
2. By a constant and cheap supply of pure water under pressure, laid on to every house and yard to the entire superseding of all local wells and pumps, the water of which is impure.
3. By the substitution of water-closets, or soil-pan apparatus (for the more expensive existing privies, cess-pools, and tub nuisances,) with proper drains to carry away all surface-water and refuse from the roofs, streets, yards, and water-closets.
4. By properly paved courts and passages, and by a regular system of washing and cleansing all courts, passages, footpaths, and surface-channels.
5. By the closing of the present overcrowded burial-grounds, and the provision of one or more cemeteries.

That these improvements may be realized, independently of any advantage to be derived from the application of town refuse to agricultural purposes, at the rates per week for each house and labourer's cottage here stated :—

1. A full and complete system of house and yard-drains, with a water-closet and soil-pan, and yard-drain to each house, *one penny* per week.
2. A constant high pressure supply of pure water laid on in each house, with a water-tap and waste-water sink to each house complete, for *one penny* a-week.
3. Complete and perfect pavement to all yards and courts, with proper surface-channels and grates, at *one halfpenny* a-week each house.
4. Washing, cleansing, and watering streets, courts, foot-walks, and surface channels, at *one farthing* a-week each house.

That these improvements will increase the health and comfort of all classes, and reduce the amount of poors'-rates.

That the direct charges stated will be the means of a direct and indirect saving to the inhabitants generally, but to the labouring man especially, of many times the amount of rate to be paid.

That the outlay will not be burthensome or oppressive to any class of the community, as the capital required may be raised by loan, and the interest upon it reduced to an annual or weekly rent-charge.

That from the character of the soil in the neighbourhood of the town, sewage manure may be applied to the agricultural land by irrigation, with singular advantage, so as to increase its value to the farmer, and yield an income for the benefit and improvement of the town.

That the Public Health Act, therefore, is not only necessary, but will be of the greatest advantage to the rate-payers generally.

I have the honour to be,

My Lords and Gentlemen,

Your obedient servant,

ROBERT RAWLINSON.

The General Board of Health,
&c. &c.